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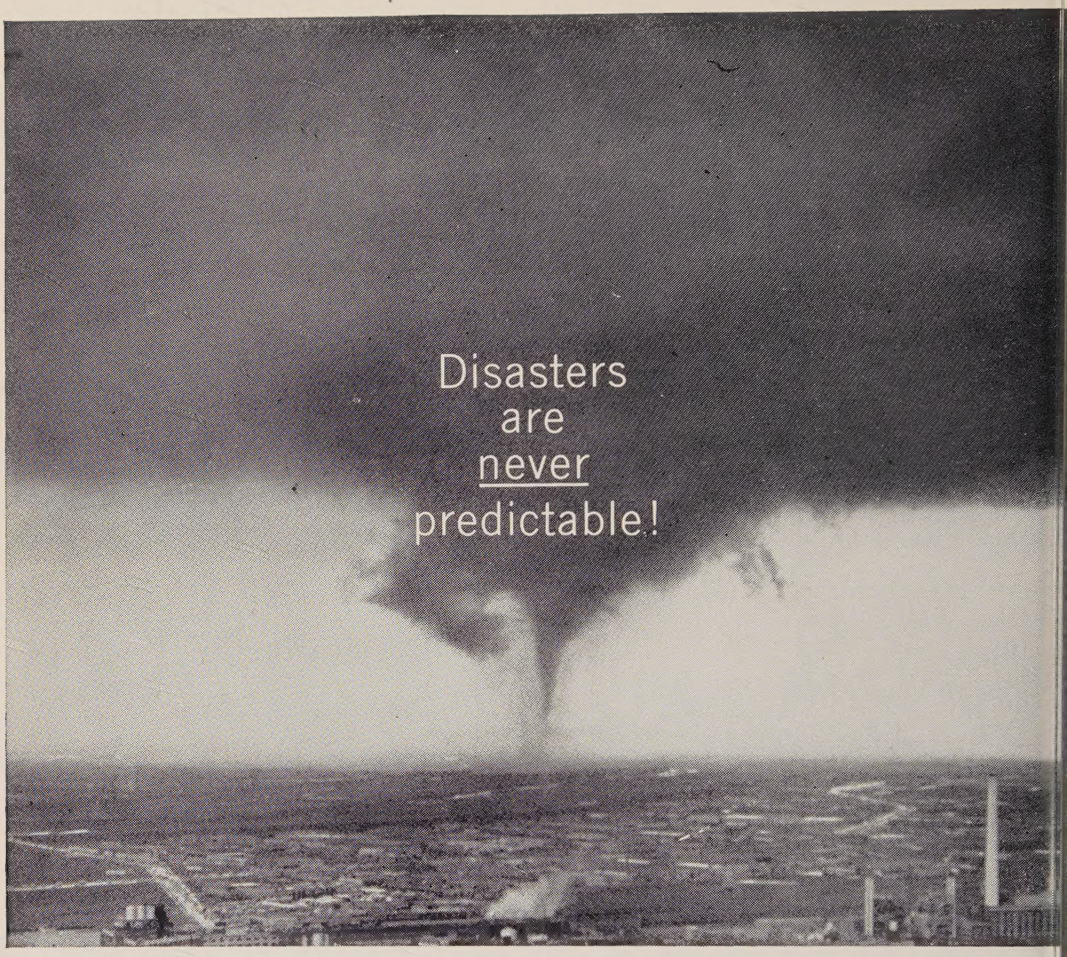

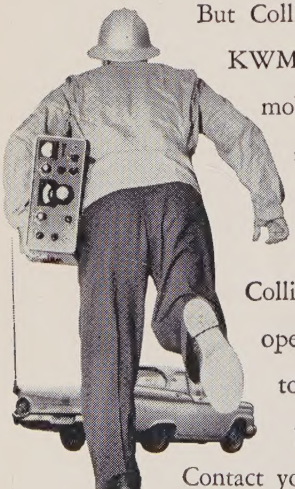

But Collins equipment is! And when a large scale disaster strikes, Collin KWM-2 Transceiver can't be matched for versatility, dependability, an mobility. Out of your ham shack and into your mobile unit is a quic and easy operation. Then just plug in your mike and you're on th air — ready to work any of the amateur bands between 3.4 and 29 mc. □ Civil defense and disaster officials have learned to depend c Collins equipment. Both for their own use and in the hands of ha operators. When handling critical communication in a hurricane, floo tornado, or other disaster, the Collins S/Line and KWM-2 will giv you the finest in both fixed station and mobile SSB performanc Contact your distributor today!

COLLINS

For further information, check number 1, on page 126

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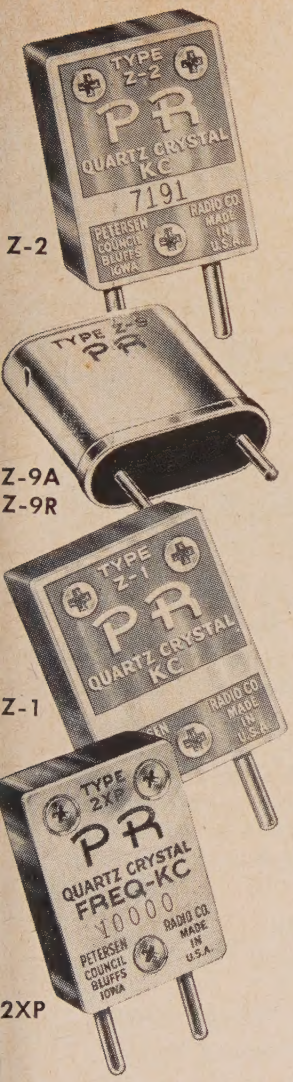

Z-2

Z-9A
Z-9R

Z-1

2XP

AMATEUR TYPES

Fundamental, PR Type Z-2

Frequency Ranges in Kcs.: 3,500 to 4,000 (80M); 7,000 to 7,425 (40M); 8,000 to 8,222 (2M); 8,334 to 9,000 (6M).

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting; ±500 cycles..... **$2.95** Net

(All Z-2 Crystals calibrated with a load of 32 mmfd.)

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Hermetically sealed; calibrated 24,000 to 24,666 and 25,000 to 27,000 Kc., ±3 Kc.; .050" pins..... **$3.95** Net

6 Meters, PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ±15 Kc.; .050" pins. **$4.95** Net

CITIZENS BAND CLASS "D"
Type Z-9R, Transmitter

FCC assigned frequencies in megacycles: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225, 27.255, calibrated to .005%. (Be sure to specify manufacturer and model number of equipment) $2.95 Net

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Specify I.F. frequency, also whether receiver oscillator is above or below transmitter frequency. Calibrated to .005%. (Be sure to specify manufacturer and model number of equipment.) ..... $2.95 Net

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Type 2XP

Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.

600 to 12000 Kc., (Fund.) ±5 Kc..... **$3.45** Net

12001 to 25000 Kc. (3rd Overtone) ±10 Kc..... **$4.45** Net

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Commercial Crystals available from 100 Kc. to 70 Mc. Prices on request.

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To determine band edge. To keep the VFO and receiver properly calibrated.

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Z-6A

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COUNCIL BLUFFS, IOWA

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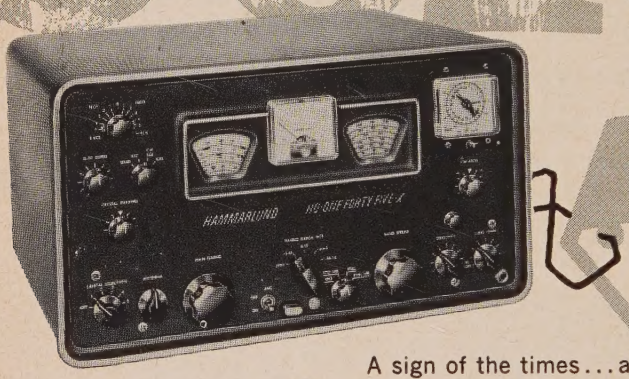

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A sign of the times... and one which is appearing with ever-increasing frequency at distributors all over the country. There's good reason for the swing to HAMMARLUND'S HQ-145X. This unit now offers all of the superb features found only in 'Big Money' receivers. These include dual conversion, crystal filter/slot filter selectivity, continuous tuning from 540 KCS to 30 MCS, improved noise limiter—in fact, everything you want in a quality receiver...

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†KC-100P Plug-in Crystal Calibrator $15.95 optional

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A Giannini Scientific Company
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Established 1910

For further information, check number 3, on page 126

CQ The Radio Amateur's Journal

VOL. 18, NO. 4 APRIL 1962

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TABLE OF CONTENTS

A U.H.F. Television Transmitter
Martin L. Kaiser, W2VCG 26

Andrew F. Schoeppel, 1894-1962 29

Beam Installation Techniques
Morton Waters, W2JDL 30

An On The Air Timer .....*Jack Myers, W5KKB* 35

MARS Bulletin 36

DXpedition To HV1CN
Lawrence LeKashman, W9IOP 37

A Florida Rock Crusher ....*Earl Carter, W4YHW* 42

CQ Reviews: The EICO 730 Modulator-Driver Kit
Lee Aurick, K3QAX 46

Lawful and Ethical Procedures
Carl Drumeller, W5EHC 48

A Simple Transmitter Control Panel
Paul Amis, W7RGL 50

A Zener Diode Transmitter
Dr. Schorza Gitchagoome 52

Tips On Working Mobile Stations
Cmdr. Gay E. Milius, Jr., USNR, W4NJF 54

A Preliminary Report:
1961 WW DX Contest ...*Frank Anzalone, W1WY* 63

CQ World-Wide V.H.F. Contest Rules 79

DEPARTMENTS

Announcements	16	Propagation	60
Contest Calendar	72	RTTY	88
DX	55	Sideband	90
Ham Clinic	84	Space Communications	69
Ham Shop	120	USA-CA	74
Letters	12	VHF	80
Novice	65	YL	94

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TURES: Beam-deflection, high level sideband ulator for low-noise, high-stability signal, Halli-ers' exclusive 5.0 Mc. quartz crystal filter with and rejection of 50 db. or more; CTO direct ng in kilocycles to within 1 kc.; 144 watts plate (P.E.P. two-tone). Five band output (80, 40, 5, 10 meters). All modes of transmission—CW, SSB. Unwanted sideband down 50 db. or more. sidebands transmitted on AM Precision gear n CTO. Exclusive Hallicrafters patented side- selection. Logarithmic meter for accurately g and carrier level adjustment. Ideal CW key-and break-in operation, push-to-talk and full control system built in. Keying circuit brought or teletype keyer.

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TURES: Rated conservatively at the maximum input. Third and fifth order distortion products in excess of 30 db. Built-in R.F. output meter ly simplifies tune-up. All important circuits red. Maximum harmonic suppression obtained gh pi-network. Variable output loading. Pro-n of power supply assured by circuit breaker. 3B is a perfect match to Hallicrafters' famous 2B in size, appearance and drive requirements. *UIT DETAILS:* This power amplifier utilizes 172 high efficiency pentode operating in class The tube is grid-driven across a non-inductive or, thus assuring the maximum stability under ssible conditions. Band switching is accom-d by one knob which selects the proper in-nce value for each band. The output circuit -network with an adjustable output capacitor, modating loads from 40 to 80 ohms. 2 panel s are provided: one is circuit switched to re grid current, screen current, plate voltage .F. output voltage. A second meter continu-monitors cathode current of the PL-172.

SX-115 RECEIVER.
FEATURES: High order of mechanical and electrical stability; linear tuning; constant tuning rate; separate noise limiters for SSB/CW/AM; amplified dual loop AVC with fast attack-slow release; spurious signal and image rejection better than 60 db. 1 kc calibration marks; transmitter-type VFO with differential TC; 100 kc crystal calibrator; crystal controlled 1st and 3rd conversion oscillators; selectable sidebands; selectivity variable in five steps from 500 to 5000 cycles; product detector for SSB/CW envelope detector for AM; I.F. type noise limiter for SSB/CW automatic threshold series type for AM; band gain equalization; audio inverse feedbacks; "S" meter functions with AVC off. *SENSITIVITY:* Less than 1 microvolt on AM—less than ½ microvolt on SSB/CW. *FREQUENCY COVERAGE:* Nine 500 kc segments covering 3.5-4.0 Mc.; 7.0-7.5 Mc.; 14.0-14.5 Mc.; 21-21.5 Mc.; 28.0-30.0 Mc.; (4 segments); and WWV.

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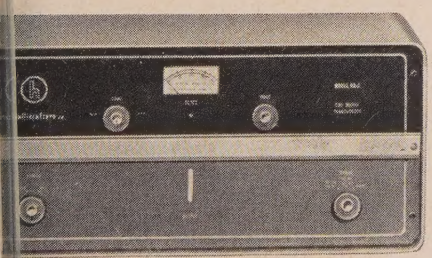
FEATURES: Converts received VHF signals down to 10 meters for reception. Converts 10-meter signal to VHF for transmission. 5894 tube in transmitter final amplifier can be driven up to 120 watts input. Can be driven by exciters with 10 to 100 watt capability. Built-in coaxial antenna relay.

HA-4 "T.O." KEYER. Compact design, employs digital techniques. Fully transistorized. **R-47 SPEAKER.** Designed for communications. Flat response from 300 to 2850 cps. Input impedance: 3.2 ohms.



HA-2—HA-6

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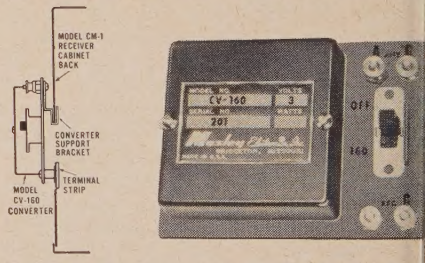
Diode detector for a.m. and product detector for s.s.b. and c.w.
Calibration every 5 kc.
WWV reception at 15 Mc.
Selectivity: ½ microvolt for 10 db. signal-to-noise ratio on ten meters.
Sensitivity: 2.5 kc. at -6 db. Automatic noise limiter.
Stability: Less than 500 cycles drift after one-minute warm-up. Less than 200 cycles change for 10% line voltage change.
Image and i.f. rejection: 35 db. minimum.
"S"-meter functions on a.m., c.w. or s.s.b. with or without b.f.o.
Audio output: ½ watt at 6% distortion into a 4 ohm speaker.
Rear chassis accessory facilities: Transmitter relay terminals, accessory power socket, external speaker/VOX terminals.
Power consumption: 33 watts. (115 volts a.c., 50 to 60 c.p.s.)
Write for complete descriptive brochure and the name of the dealer handling the CM-1 in your area.
Amateur Net, $182.70 * (All crystals included)
Matching Speaker, Model CMS-1. Amateur Net, $16.95 *



New! MOSLEY 160 METER CONVERTER
Model CV-160

Converts the 160 meter band, 1750-2000 kc. t 3700-3950 kc. for reception on most 80 met band receivers.

Designed to attach directly to rear of the Mosle CM-1 and adaptable to most other amateur ban receivers.

Connects only to antenna and ground terminals receiver. No other connections are require

Transistorized, crystal controlled, printed circu self powered by two penlite cells (not include

*Amateur Net, $14.95 **

* *Slightly higher west of Rockies and outside U.S.A.*

Mosley Electronics Inc.
4610 N. LINDBERGH BLVD. BRIDGETON, MO.

For further information, check number 6, on page 126

ZERO BIAS

RUMORS regarding the proposed licensing fee for amateurs as well as other users of FCC services have finally materialized in the form of Docket 14507, released by the Federal Communications Commission on February 16, 1962. The contemplated fees proposed for Amateurs, RACES, and Disaster Radio Services has been tentatively set at $5.00, compared to $250.00 for commercial TV stations and $150.00 for commercial a.m. and f.m. broadcasters.

The basic reason for a license fee at this time is brought about by the attitude that the Commission, through its regulatory activities, would like to see itself become a more financially self-sustaining body. They feel, and we are in total agreement, that the American taxpayer should not carry the financial burden of the Commission's operations, since the general public does not receive, directly, the services supplied by the Commission.

We feel, however, that *non-commercial* licencees, into which category the amateur falls, should be completely exempt from such fees.

Amateur radio is, by law, prohibited to receive financial remuneration for its services performed to the public. To charge a licensing fee would in a way, be similar to taxation without representation. To quote:

> §12.102 An amateur station shall not be used to transmit or receive messages for hire, nor for communication for material compensation, direct or indirect, paid or promised.

Amateurs are a self-policing body. Besides the great number of ARRL-organized volunteer Official Observers that monitor the amateur bands and report minor violations, at no expense to the government, a large percentage of amateur examinations are performed by radio amateurs themselves, again reducing Commission costs considerably.

Amateurs have been and will always remain a reservoir of highly skilled technicians and experts, on which the government can rely at any time. Through amateur good-will, international relations have consistently improved and continue to do so even in the dim light of today's political dilemma.

Through Project OSCAR, the first non-military, non-commercial earth satellite, amateur radio reached the pinnacle of scientific achievement, contributing greatly to the advancement of the radio art.

We feel it is unjust and improper to levy a license fee on those who have given so much of themselves, for their neighbor, their community and their nation.

Let us now propose a hypothetical case, wherein Nelson Big, an avid short wave listener, asks a neighboring amateur to administer his Novice examination. He passes, of course, and Nelson shells out his first license fee of $5.00. In a few months, after Nelson is well acquainted with the theory, he takes the Technician exam from the same friendly neighbor and once again forks over another five bucks. Getting bit by the DX bug, Nelson bones up on the code and in a couple of months is ready for the General at a local FCC office. Thirteen words per minute at the FCC invariably sounds like 33 w.p.m. and Nelson freezes at the key. Although he's flunked the test he still dishes out his $5.00 fee. Thirty days later, after shaking the shakes, Nelson passes with flying colors and hands over his final $5.00. Or is it?

Nelson is a pretty clever guy, and the job promotion he's been waiting for has finally come through. He moves to his new position upstate and—yep, you guessed it, another five dollars for a license modification. This, of course, isn't the end. The Amateur Extra will cost him another five, and renewals every five years, still another five.

Granted, the above is a hypothetical case, but is it unrealistic? No! In less than a year, "poor" Nelson has shelled out $25.00 and that new rotary is now out of the question.

We urge you to read FCC Docket 14507 beginning on page 18 of this issue. Digest it well. Paragraph five states: "It has been suggested alternatively that non-commercial services such as non-commercial educational f.m. and TV, the public safety radio services, and the experimental services should be charged either a token fee or should be free of any obligation. Comments on this point are specifically requested."

Write the Commission today. Despite the requirement of having all correspondence submitted in original and 14 copies, it is up to all of us to let the Commission know our views.

OUR COVER

Col. John Glenn prior to his flight in *Friendship 7* on February 20, 1962. *CQ* will, in a subsequent issue, bring you highlights of the communications aspect of Project Mercury which involved the work performed by radio amateurs associated with the project.

Heathkit® puts you in
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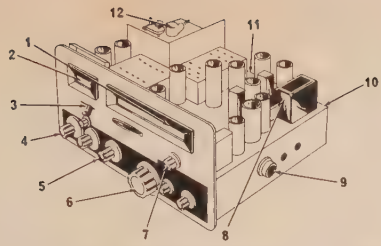
economically!



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SSB Portable, fixed station or mobile

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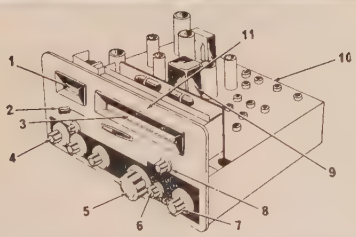

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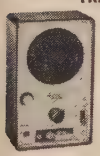

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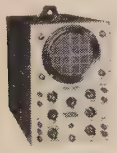
Kit $25.95 Wired $39.95
*U. S. Pat. No. 2,790,051



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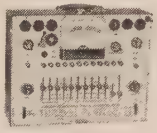
5" PUSH-PULL OSCILLOSCOPE #425
Kit $44.95 Wired $79.95



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For further information, check number 10, on page 126

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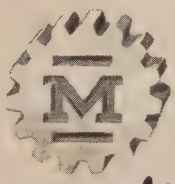
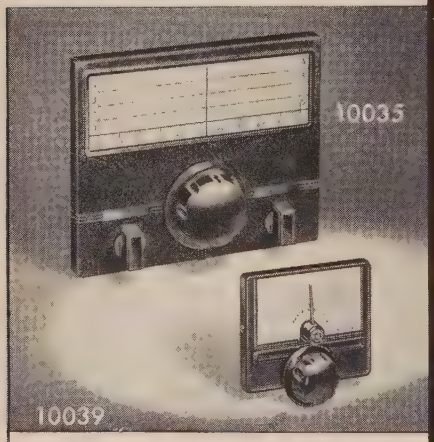


Application



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Letters..... to the Editor

Marconi

"Guglielmo Marconi and the Sixtieth Anniversary of Trans-Atlantic Wireless Communication," by George Jacobs, W3ASK, which appeared in December's CQ, has been roundly applauded by readers throughout the world. Among the large number of favorable comments received were requests from several foreign technical publications for permission to reprint the article, and it has already been translated into at least five different languages! The following are samples of some of the comments received:

Editor, *CQ:*

In reference to "Guglielmo Marconi . . .," which appeared in the December (1961) issue of *CQ*, I think that it was a very interesting article and I was pleased to hear how far and wide it has percolated.

I hope you will forgive me if in the friendliest way, I take issue with you over the statement that the New York yacht races in 1899 was the first instance of the use of wireless for covering a sports event. No, sir! The year before, Marconi used his wireless at the Kingstown Regatta in Dublin Bay, to report the races to the *Dublin Daily Express*. This also constituted the first use of wireless for journalism.

Two other small points, if I may be so bold. As is said in the article, Marconi was born near the Italian city of Bologna, but it was at the *Palazzo Marescalchi*, not Marzabotto, which is a name that is quite new to me. While Marconi's father was wealthy, I do not think he was a "banker." He has been variously described as a "country gentleman," "a prosperous businessman," and "an able businessman of independent means," etc.

The granite column which has been erected to commemorate the site of the former wireless station at Poldhu, Cornwall, from which the first transatlantic signal was radiated. *(Photo courtesy Marconi's Wireless Telegraph Co., Ltd.)*

For further information, check number 11, on page 1

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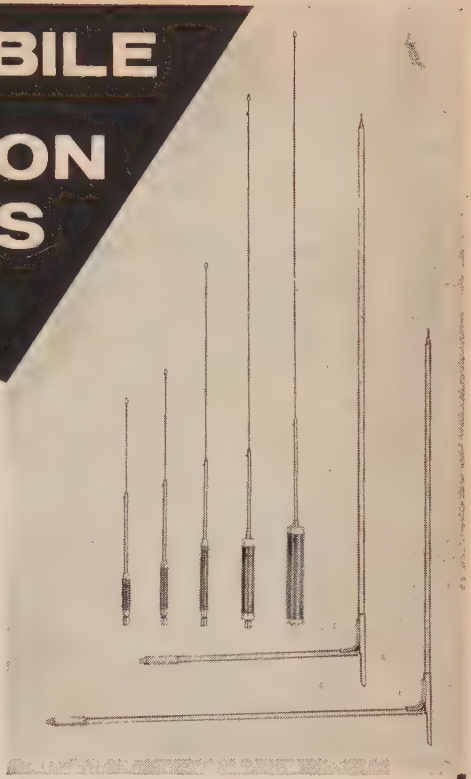

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RM-15	15 Meter Resonator	Maximum 81" — Minimum 76"	6.95
RM-20	20 Meter Resonator	Maximum 83" — Minimum 78"	7.95
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Assembly is held in place by two "J" bolts at the top of the bumper and strap clamp at the bottom. "J" bolts may be inserted between top of bumper and car body where clearance is as low as ¼".

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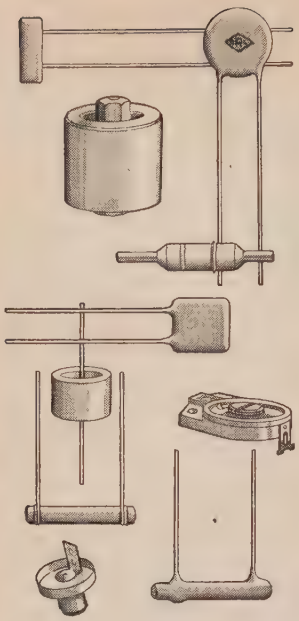
For further information, check number 12, on page 126



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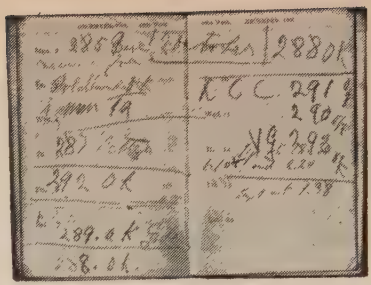
For further information, check number 13, on page 126



Marconi's diary containing the entry for December 12, 1901: "Sigs at 12.30, 1.10 and 2.20." on the 13th he recorded; "Sigs at 1.38. ***(Photo courtesy Marconi's Wireless Telegraph Co., Ltd.)***

We here at Marconi's have been immersed in the story of Marconi's 1901 triumph in recent weeks and are just closing a special six week exhibition which we put on at the Science Museum in London in December and which had as a central exhibit a working model depicting the first transatlantic signal.

R. W. Bell
Publicity Manager
Marconi's Wireless Telegraph Company, Ltd.
Marconi House,
Chelmsford, England

Editor, *CQ*:

We have been greatly interested in your informative article "Guglielmo Marconi . . ." As we would very much like to reprint this article in a French translation, in the *PTT-Zeitschrift*, the official organ of the Swiss Post Office, we take the liberty of asking your kind permission to do so.

Secretary-General, PTT
Post, Telephone & Telegraph Administration
Bern, Switzerland

Editor, *CQ*:

I have just finished reading your wonderful article of "Guglielmo Marconi . . ." It is really f.b., and one of the best I have ever read on the subject.

As editor of *CQ-QSO*, the official Journal of the Union of Belgian Radio Amateurs, I know that radio amateurs in my country would enjoy reading a translation of the story. I would like to request your permission to translate the article and reprint it in a forthcoming issue of *CQ-QSO*.

W. Surmont, ON4SX/WJ
Editor, *CQ-QSO*
Brussels, Belgium

Editor, *CQ*:

Thank you very much for permission to reprint your most interesting article about Marconi in the *Telecommunication Journal* of the ITU. The article was translated into French, and Spanish, and was featured in the December (1961) issue of the Journal, along with the English version. As you know, the *Journal* appears in three languages, and is subscribed to by telecommunication authorities in almost every country of the world.

I think the article came out very well, and I have already had several favourable comments.

Colin Mackenzie
Editor, *Telecommunication Journal*
Geneva, Switzerland

Blush Blush!

Editor, *CQ*:

I have long appreciated the support *CQ* has given to operation of 160 meters. I believe that the annual 160 meter c.w. contest is a fine way to increase interest in this band.

I was quite surprised, however, to learn from the article by K2BUS in the February '62 issue that the 160 meter band is not very practical for mobile opera-

[*Continued on page 104*]

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Now you can switch coaxial line circuits quickly and without error. These handy, inexpensive units are available with "UHF", "BNC", "N" and Phono type connectors for use with either 52 or 75 ohm lines. Phono connector types are specific for Hi-Fi applications. Other types are designed to handle RF Power up to 30 MC, 1 KW input.

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Model 550A—Single gang, single pole, 5 position switch with UHF connectors. Price: $8.25 each.

Model 551A—Single gang, 2 pole, 2 position special purpose switch with UHF connectors. Ideal for switching any device in or out of series connection in coax line circuits. Price: $7.95 each.

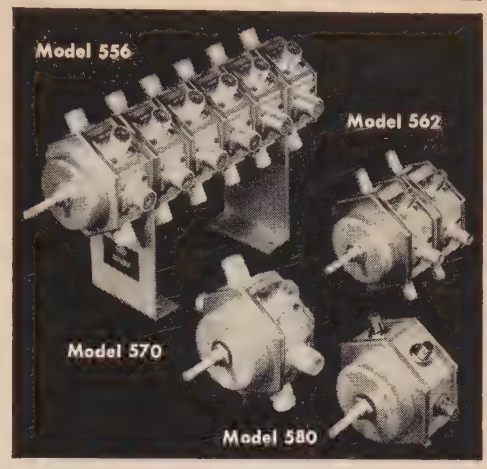
Model 560—Single gang, single pole, 5 position switch, same as Model 550A except with BNC type connectors. Price: $11.95 each.

Model 561—Single gang, 2 pole, 2 position special purpose switch, same as Model 551A except with BNC type connectors. Price: $9.95 each.

Model 570—Single gang, single pole, 5 position switch, same as Model 550A except with N type connectors. Price: $13.35 each.

Model 580—Single gang, single pole, 5 position switch, same as Model 550A except with Phono type connectors. Price: $7.35 each.

Multiple gang types, up to 6 gang for single pole—5 position switches, and as required for 2 pole—2 position switches, are made to order with any connector types listed above. Prices on request.



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For further information, check number 23, on page 126

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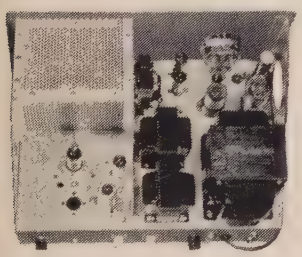

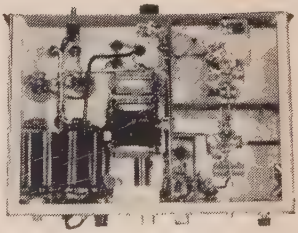

Here's the simple, easy way to go VHF on SIX METERS! Just feed the 20 meter output of your present SSB, AM or CW exciter into the P&H 6-150 and you have 175 Watts PEP on SIX METERS, either crystal or VFO controlled, depending on your exciter features. Resistive Pi-Pad and switchable Half-Power Pad permits operation with any 5 to 100 Watt exciter. Since the 6-150 is a high stability mixing device, the output signal stability is the same as that of your exciter. Uses a 6CX8 crystal oscillator/Class A buffer; a 6360 Balanced Mixer and a NEW AMPEREX 8117 push-pull output tube. Power input to 8117 final: 175 Watts PEP on SSB, 165 Watts CW, 90 Watts linear AM. Entire chassis and all shielding is COPPER PLATED. Output jack provided to furnish oscillator signal injection for receiving converter. Quiet 200 CFM forced-air cooling. 50-70 ohm input and output impedances. Husky built-in power supply has three separate rectifiers and filter combinations. Meter reads; PA GRID, PA PLATE and RELATIVE RF OUTPUT. Modernistic curved corner grey cabinet; 9" X 15" X 10½". The P&H 6-150 is so thoroughly shielded, by-passed and parasitic-free that it operates as smoothly as an 80 meter transmitter. COMING SOON! THE P&H 2-150 FOR TWO METERS!

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P&H ELECTRONICS INC.

424 Columbia , Lafayette, Ind.

For further information, check number 24, on page 126

For further information, check number 15, on page 126

N. D. Hamfest

The North Dakota State University Campus will be the site for the forthcoming hamfest sponsored by the Electrical Engineering Dept. scheduled for April 29th. Prizes, contests and lunch will be part of the program. The N.D.S.U. A.R.C. will fill you in on all the incidentals. They are in Fargo.

Tri-State S.S.B.ers

On April 28th, starting at 6:30 P.M. the Tri-State Sidebanders will hold their annual dinner at Johnny Garneau's Smorgasbord Restaurant, 3800 William Penn Highway, Monroeville, Penna. (one mile west of Pittsburgh Interchange on Rt. 22). Tickets are $4.00 each and can be obtained from K3EVR, 243 Poplar St., Monroeville, Pa.

DXCC Dinner

The gang in Ø-Land inform us that the annual WØ-DXCC dinner and meeting will be held at the Holiday Inn Motel in St. Louis on April 28th. The gathering starts at 1300 and dinner starts at 1900. Reservations are 6-bux and can be obtained from Sam Halley, WØIJW, 5022 Queens Ave., St. Louis 15, Mo.

100th Anniversary

Long before a "chassis" was considered an electrical term, the company known throughout the electrical world for their chassis punches was making tools and dies for industry. The Greenlee Company of Rockford, Illinois, celebrates its 100th Birthday this month. Congratulations!!

What's Going On Here?

Stolen: From the West Branch Amateur Radio Club in Williamsport, Penn.; a Gonset Communicator II-B, Serial # CD 11773D.

Stolen: From the Milwaukee School of Engineering A.R.C. (W9HHX) 1025 N. Milwaukee St., Milwaukee, Wisc.; a Central Electronics 100V, Serial #58.

Stolen: From K5REV, 10235 Linkwood Dr., Dallas 18, Texas; a Gonset G-76, Serial # B-1231.

Please notify local police or owners if this equipment turns up. K5REV says a reward is up for the capture of the culprit.

1913 Radio Amateurs

The Old Old Timers Club is making a list of present day hams who are in the first U. S. Government call book which included amateurs. This book is *Radio Stations of the United States* published by the Bureau of Navigation, Department of Commerce, July 1, 1913. For some reason or other, several hams who are known to have been licensed in 1912 or early 1913 are not in the first book. No claim is made that the following list is complete. Compiled by W1NP.

Present Call		*1913 Call*
W1AE	George E. Sterling	1AE
W1AI	Olin C. Brown	1AI
W1AN	Chester A. Kennedy	1AC
W1DIU	Sebastian Gahm	1JL
W1DQ	Harold C. Bowen	1KO
W1GJ	Richard M. Daniels	1GJ
W1GV	Malcolm H. Smith	1GN
W1HW	Henry T. Munroe	1HW
W1IH	Lawrence S. Bennett	1HY
W1IV	Clark B. Merrill	1HO
W1JV	Fearing Pratt	1JG
W1LV	Irving E. Cutting	9AI
W1MH	George W. Vaughan	2MG
W1PH	Edward E. Hayward	1JE
W1RL	Francis W. Dane	1JU
W1RM	Alan W. Burke	1HI
W1RZ	Albert E. Snow	1JF
W1TK	John E. Wilkinson	1KN
W1UA	Harold T. Hargraves	1UA
W1UE	George H. Jette	1UE
W1VR	Thomas R. Pennypacker	1KF
K2BA	Harry M. Ash	2BA
W2BM	Earl Hermance	2BM

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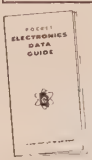

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W6YI	Larry J. Barton	6LB
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W8DG	Daniel C. McCoy	2HA
W8DJ	Edmund H. Bremer	8DG
W9WK	Carroll W. Thomas	9AH
VE1AJ	Joseph J. Holmes	6DQ

LICENSING FEES

Licensing fees for amateurs as well as all spectrum users, is now being sought by the FCC. It is urged that you carefully read the following, and note the dissenting comments made by Commissioner Bartley. Editorial comment on Docket 14507 appears on page 7.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D.C.

In the Matter of

Establishment of fees for the Commission's licensing and regulatory activities } DOCKET NO. 14507

NOTICE OF PROPOSED RULE MAKING

Notice is hereby given of rule-making in the above-entitled matter.

In the provisions of the Independent Offices Appropriation Act of 1952, (5 U.S.C., Sec. 140), set out in Appendix A hereto, Congress has stated, "that any work, service, publication, report, document, benefit privilege, authority, use, franchise, license, permit, certificate, registration, or similar thing of value or utility performed, furnished, provided, granted, prepared or issued by an Federal agency . . . to or for any person . . ., except those engaged in the transaction of official business of the Government, shall be self-sustaining to the full extent possible." In order to bring about the accomplishment of this objective, Section 140 of Title 5 authorizes the head of each agency to prescribe by regulation such fees and charges as he shall determine to be fair and equitable "taking into consideration direct and indirect cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts."

The enabling legislation referred to above also provides that the fees and charges shall be as uniform as practicable and subject to such policies as the President may prescribe. The Bureau of the Budget operating in behalf of the President has issued Circular No. A-25, September 23, 1959, which sets forth general policies for developing an equitable and uniform system of charges for certain Government services and property so as to implement the provisions of the Independent Offices Appropriation Act of 1952.

The Federal Communications Commission, in conducting its regulatory activities, conveys special benefits to identifiable recipients above and beyond those which accrue to the public at large. In fairness to the general taxpayer—who bears the major burden of supporting Federal agencies—the Government has adopted the policy that the recipient of special benefits conveyed by a Federal agency should pay a reasonable charge for the benefits received. In accordance with this policy, the Commission has determined that the public interest would be served by the establishment of a fair and equitable schedule of fees for its licensing and regulatory activities, thereby recouping for the Government a portion of the Commission's cost of regulating the communications industry. The authority for proceeding in this area is clearly outlined in the provisions set forth in Appendix A.

[*Continued on page 102*]

More power— greater flexibility
for the MOBILEER with the NEW Gonset "Gooney Bird"

$251.00
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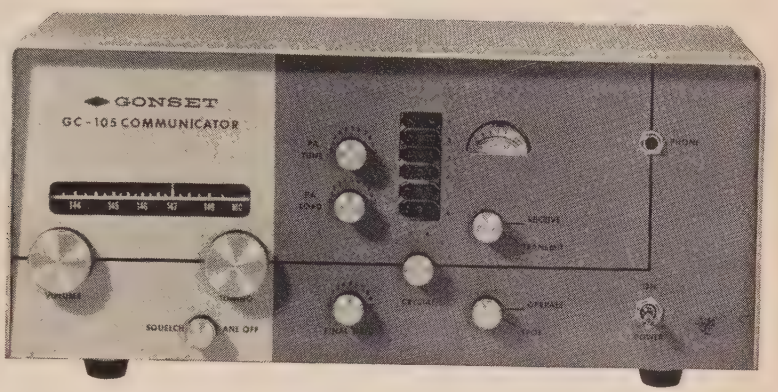
Net



The Gonset GC-105 is a complete, self-contained 2 meter station, with transmitter, receiver and built-in power supply. In a stream-lined case of contemporary design, it provides a new low silhouette for convenient under-dash mounting. The Gonset "Gooney Bird" gives you top performance at moderate cost—plus famous Gonset reliability.

The 2 meter Gonset GC-105 "Gooney Bird" offers these deluxe features:

Silicon diodes to save current drain • calibrated tunable receiver utilizes low-noise 6BZ8 RF tube in sensitive "Cascode" circuit • AVC is applied to avoid possibility of blocking by strong local signals • special gang-tuned circuits give high image rejection • dual purpose meter automatically switches from relative signal strength to relative output • increased modulation capabilities with high level clipping • all tunable circuits controlled from front panel • tune-up procedure simplified by use of broad-banded exciter stages • completely compatible with Gonset's new model 3357 VFO or 6 crystal positions available.

Input: 6/12 DC or 115 AC volt operation, power cables supplied
Output: 6 watts nominal
Dimensions: 6½" high, 15½" wide, 8" deep

See the all-new Gonset GC-105 at your Gonset Distributor NOW!

GONSET®
DIVISION OF YOUNG SPRING & WIRE CORPORATION
801 SOUTH MAIN STREET, BURBANK, CALIFORNIA

For further information, check number 17, on page 126

NOW AVAILABLE

A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, operating procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section on getting started, all written by Byron Kretzman, W2JTP, a well known authority in the field. This book is a *must* for your library!

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RELiant L-103 1 KW LINEAR AMPLIFIER

Here is a piece of commercial gear . . . to fascinate the discriminating amateur. Brilliantly designed—as modern as tomorrow—the REL L-103 1 KW Linear Amplifier sets new standards of performance and achieves the distinction of proven, **measurable** power output of 1000 watts PEP, CW, SSB, and FSK.

This completely self-contained, two-tube grounded grid linear amplifier measures only 7″ high, 15″ wide and 12″ deep—yet gives you the **big** signal you want—consistently.

Matching power supply provides plate power and regulated screen voltage for the amplifier.

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Please send me complete technical data and price of the new REL type L-103 1 KW Linear Amplifier.

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ADDRESS.....

.....

For further information, check number 19, on page 126

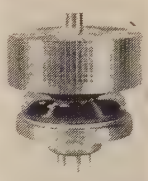
PATTERN FOR PERFORMANCE

Here is a straightforward approach to the problem of preventing electrons from returning to the screen region of a transmitting tube. When channeled into beams like those below, electrons reach the anode, where they do their useful work. Penta's exclusive, patented vane-type suppressor grid does the trick.

The characteristics of Penta tubes employing this electrode geometry approach those of the theoretically perfect beam tube. Plate current is practically independent of plate voltage. Kinks and wiggles are absent. Plate voltage can swing well below screen voltage without appreciable loss of current.

The result is outstanding linearity, efficiency, stability. Penta's PL-172, for example, delivers 1000 watts of Class AB_1 useful output at only 2000 plate volts . . . more than 1500 watts at maximum Class AB_1 ratings. Introduced in 1955, Penta tubes with vane-type suppressor grids are in important equipment the world over, and their use in high-quality linear amplifiers is growing daily.

You, too, can enjoy the advantages of this years-ahead design by specifying the PL-177A, PL-175A or PL-172 for 100-watt to 1.5-kilowatt power output applications. Detailed, factual data sheets are available for the asking. Ask also for your copy of "Transmitting Tubes for Linear Amplifier Service," which explains how and why this exclusive Penta design provides outstanding performance.



PL-172 1000W beam pentode. High-output Class AB_1 linear amplifier.

PL-175A 400W beam pentode. Popular Class AB_1 linear amplifier.

PL-177A 75W beam pentode. To 175mc. Highly efficient at plate voltages as low as 600v.

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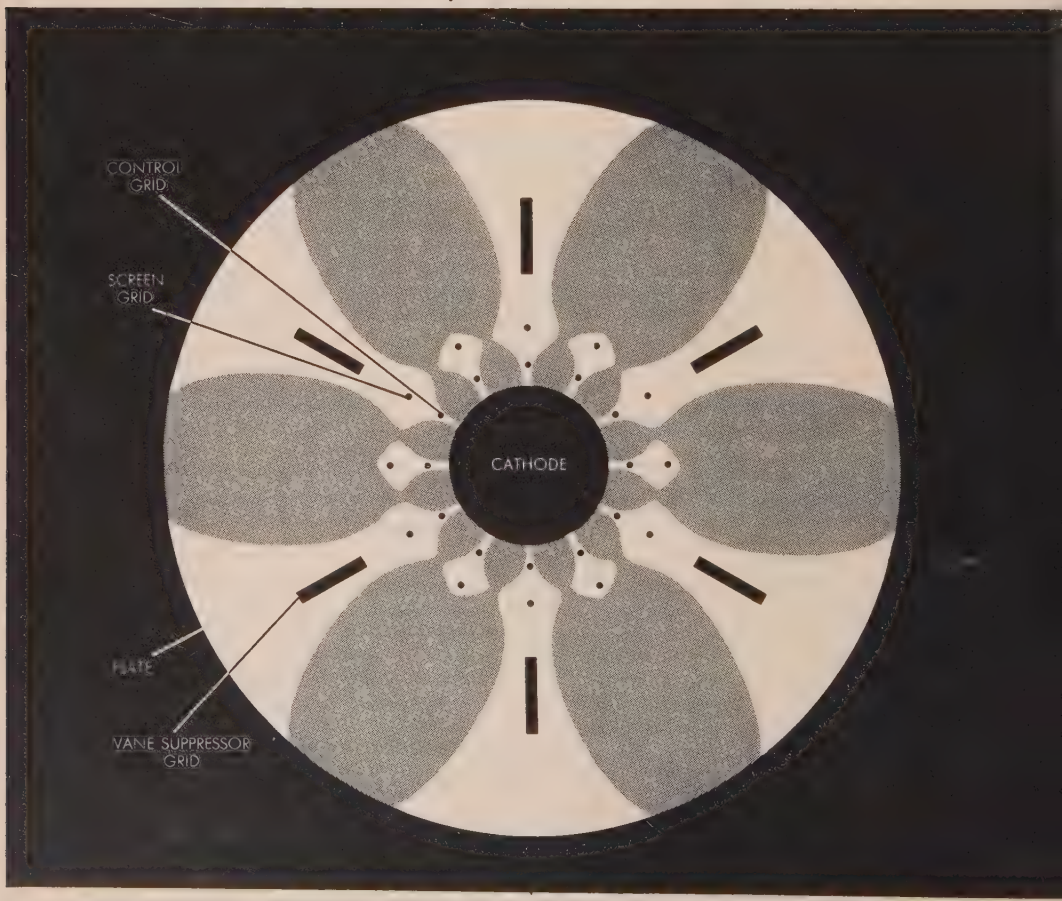


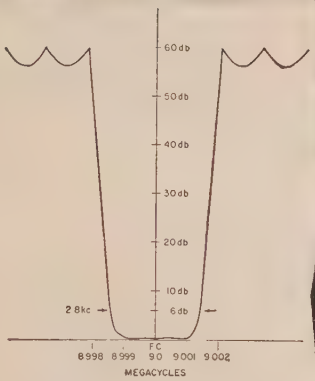
For further information, check number 20, on page 126

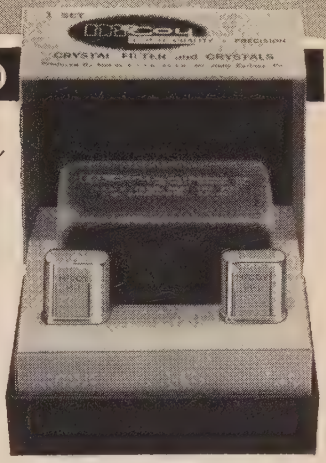
Now! for discriminating amateurs who are satisfied with nothing less than *THE VERY BEST*

McCoy SINGLE SIDE BAND FILTERS

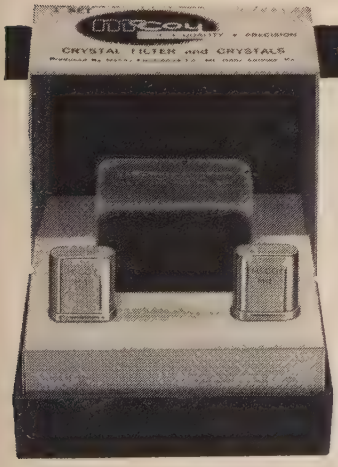
The GOLDEN GUARDIAN (48B1)

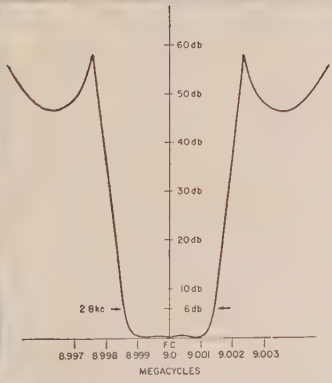
TECHNICAL DATA
Impedance: 640 Ohms in and out (unbalanced to ground)
Unwanted Side Band Rejection: Greater than 55db
Passband Ripple: ± .5db
Shape factor: 6 to 20db 1.15 to 1
Shape factor: 6 to 50db 1.44 to 1
Package Size: 2 7/16" x 1 19/32" x 1"
Price: $42.95 Each





The SILVER SENTINEL (32B1)





TECHNICAL DATA
Impedance: 560 Ohms in and out
Unwanted Side Band Rejection: Greater than 40db
Passband Ripple: ± .5db
Shape factor: 6 to 20db 1.21 to 1
Shape factor: 6 to 50db 1.56 to 1
Package Size: 1¾" x 1¼" x 1"
Price: $32.95 Each

Both the Golden Guardian and the Silver Sentinel contain a precision McCoy filter and two of the famous M-1 McCoy Oscillator crystals. By switching crystals either upper or lower side band operation may be selected. Balanced modulator circuit will be supplied upon request.

Both sets are available through leading distributors. To obtain the name of the distributor nearest you or for additional specific information, write:

McCoy ELECTRONICS CO.
Dept. CQ-4
MT. HOLLY SPRINGS, PA.
Phone: HUnter 6-3411

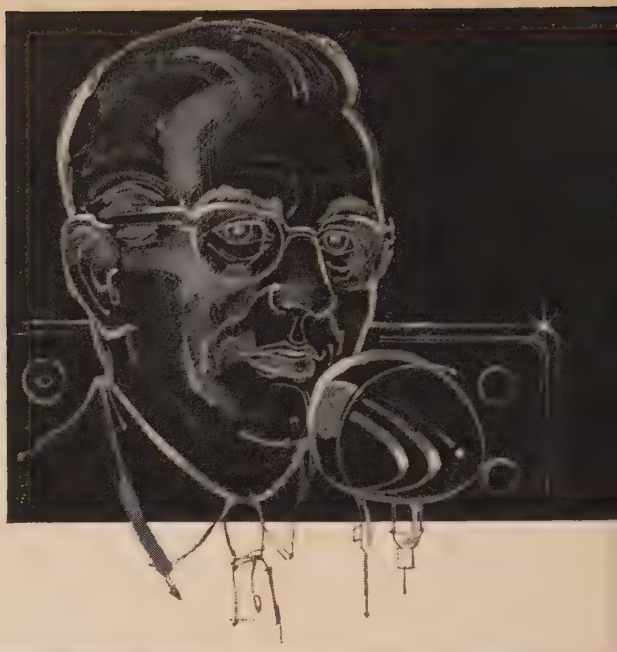
SUBSIDIARY OF OAK MANUFACTURING CO.

For further information, check number 21, on page 126

FOR NOVICE OR EXPERIENCED AMATEUR . . .

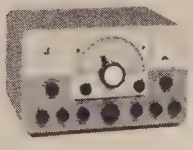
Viking transmitters are your best buy! And here's why . . .

Excellent dollar value . . . solid power . . . dozens of convenience features—just a few of the many good reasons why you get much more with a Viking! Yes, dollar for dollar, a Viking is your best buy . . . and that's why Viking transmitters are "first choice" among the nation's amateurs!



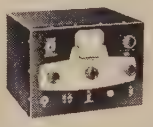
NEW! "10 METER PERSONAL MESSENGER" Two models: 100 milliwatts for short range; 1 watt for extended range—11 transistors and 4 diodes—super-heterodyne receiver with tuned RF amplifier gives excellent sensitivity—two stage transmitter punches signal home, delivers high power output—smooth operating "Quiet" control silences receiver on standby. With battery compartment for penlight cells (less cells) Rechargeable cadmium battery and other accessories available.

Cat. No.	Amateur Net
242-103 100 milliwatt	$109.50
242-104 1 watt	$129.50



RANGER II—Now—a new version of the popular 75 watt CW or 65 watt AM "Ranger". The "Ranger II" transmitter also serves as an RF/audio exciter for high power equipment. Completely self-contained instant bandswitching 160 thru 6 meters! Operates by built-in VFO or crystal control. High gain audio-timed sequence keying, TVI suppressed. Pi-network load matching from 50 to 500 ohms. With tubes, less crystals.

Cat. No.	Amateur Net
240-162-1 Kit	$249.50
240-162-2 Wired, tested	$359.50

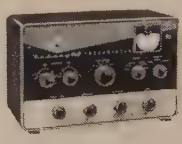


ADVENTURER—Completely self-contained single knob bandswitching 80 thru 10 meters . . . effective TVI suppressed . . . and puts 50 watts of power into a rugged 807 transmitting tube. Operates by crystal or external VFO control. Front panel meter switching permits monitoring of the final grid or plate currents . . . keying is clean and crisp. Wide range pi-network output. With tubes, less crystals.

Cat. No.	Amateur Net
240-181-1 Kit	$54.95

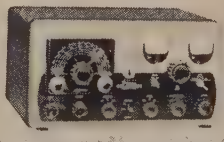
VALIANT—275 watts input CW and SSB(P.E.P. with auxiliary SSB exciter) 200 watts phone. Instant bandswitching 160 thru 10 meters—built-in VFO or crystal control. Pi-network output matches antenna loads from 50 to 600 ohms. TVI suppressed—timed sequence keying—built-in low pass audio filter—self-contained power supplies. With tubes, less crystals.

Cat. No.	Amateur Net
240-104-1 Kit	$349.50
240-104-2 Wired, tested	$439.50



6N2—Rated 150 watts CW and 100 watts phone—offers instant bandswitching coverage of both 6 and 2 meters. Fully TVI suppressed—may be used with "Viking I, II", "Range I, II", "Valiant" or similar power supply/modulator combination. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.

Cat. No.	Amateur Net
240-201-1 Kit	$129.50
240-201-2 Wired, tested	$169.50



FIVE HUNDRED—Full 600 watts CW—500 watts phone and SSB(P.E.P. with auxiliary SSB exciter). Compact RF unit designed for desk-top operation. All exciter stages ganged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 thru 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.

Cat. No.	Amateur Net
240-500-1 Kit	$749.50
240-500-2 Wired, tested	$949.50

FACTORY AUTHORIZED SERVICE

Instead of shipping to our factory, equipment to be serviced may also be sent to:

Empire State Elect. Service
139-140 Hillside Ave.
Jamaica, New York

Park-Armature Co.
1218 Columbus Ave.
Boston 20, Mass.

Heights Electronics, Inc.
1145 Halsted Street
Chicago Heights, Ill.

B and S Electronics, Inc.
6326 W. Roosevelt Rd.
Oak Park, Ill.

Radio Communication and Engr.
Pinehurst Place
Charlotte 9, N. C.

INVADER—More exclusive features than any other Transmitter/Exciter on the market today! Specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db. sideband suppression—more than 55 db carrier suppression! Instant bandswitching 80 thru 10 meters—no extra crystals to buy—no realigning necessary. Delivers solid 200 watts CW and P.E.P. SSB input; 90 watts AM (25 to 30 watts output—upper sideband and carrier). Built-in VFO—exclusive RF controlled audio A6C and ALS (limiter type) provide greater average speech power. Wide range pi-network output circuit—extremely smooth VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. Wired and tested, with tubes and crystals.

Cat. No. 240-302-2 Amateur Net.....**$619.50**

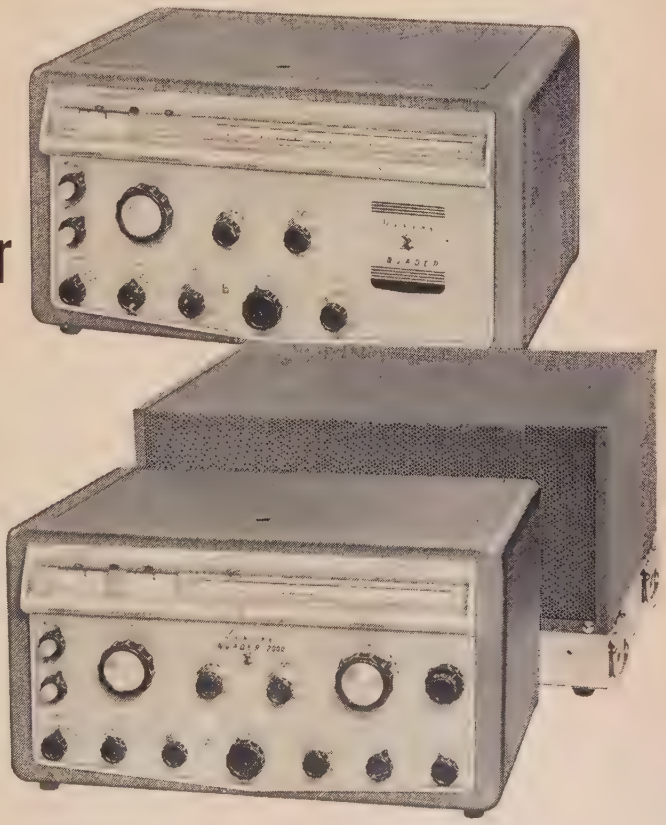
INVADER 2000—Here are all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated a solid 2000 watts P.E.P. (twice average DC) input on SSB; 1000 watts CW; and 800 watts AM (250 to 300 watts output—upper sideband and carrier). Wide range output circuit (40 to 600 ohms adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. Wired and tested, with power supply, tubes and crystals.

Cat. No. 240-304-2 Amateur Net.....**$1229.00**

HIGH POWER CONVERSION—Take the features and performance of your "Invader"... add the power and flexibility of this unique Viking "Hi-Power Conversion" system ... and you're "on the air" with the "Invader 2000". Completely wired and tested, includes everything you need—no soldering necessary—complete the entire conversion in one evening.

Cat. No. 240-303-2 Amateur Net.....**$619.50**

choose your next transmitter from the feature packed Viking line!



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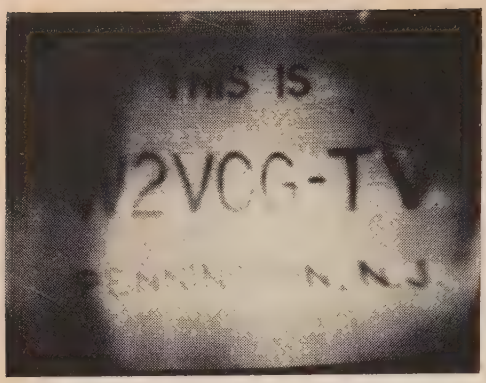


The left photo was taken at the monitor receiver twenty feet from the transmitter. The right photo was taken from a receiver approximately 3 miles away. The power output (with both photos) was ½ watt.

A U. H. F. Television Transmitter

BY MARTIN L. KAISER*, W2VCG

Many amateurs have had the desire to experiment with TV transmission but have been discouraged by the complexity and the cost of the systems described in the past. Here is a unit that will enable you to get on the air with a minimum outlay of cash and time.

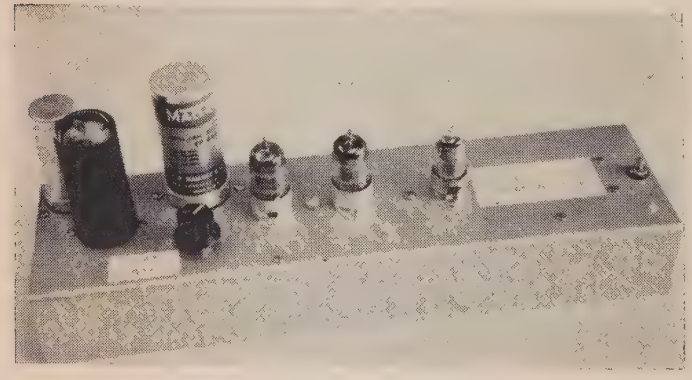
UNTIL now an amateur interested in television as a means of communication had to have plenty of money and considerable technical "knowhow" to get on the air. Both of these obstacles have been overcome by this new, simple and inexpensive video pickup device and u.h.f. transmitter. The moderate cost of this unit ($30.00 or less) will allow any amateur to experiment in this unusual field.

To begin operating the u.h.f. TV transmitter, you will need a TV set with minor wiring changes. For receiving, a u.h.f. TV set or an inexpensive u.h.f. converter is used. For experimental purposes a second TV set, located in another room to prevent scanning interference, may be used as a monitor.

*Conversion Devices Laboratory, RCA Laboratories, Princeton, N.J.

Circuit Operation

The u.h.f. transmitter is built on a 14" × 4" × 2" chassis with a phototube facing forward and a u.h.f. long-lines oscillator occupying the rear 5¼". A 931 photomultiplier is used in this particular unit as the light detector. The video signal appears across the multiplier load resistor, R_1. A 50K potentiometer, R_2, and a 300 mmf capacitor, C_1, form a network to correct for initial phosphor decay and to shape the synchronizing pulse received from a TV



Top view of the TV transmitter. The 931 photo multiplier is on the left enclosed by the split shield. It is followed by the two 6AN8's and the 6J6 oscillator. The decay control is to the right of the 931 and the oscillator frequency control, C_3, is at the extreme right.

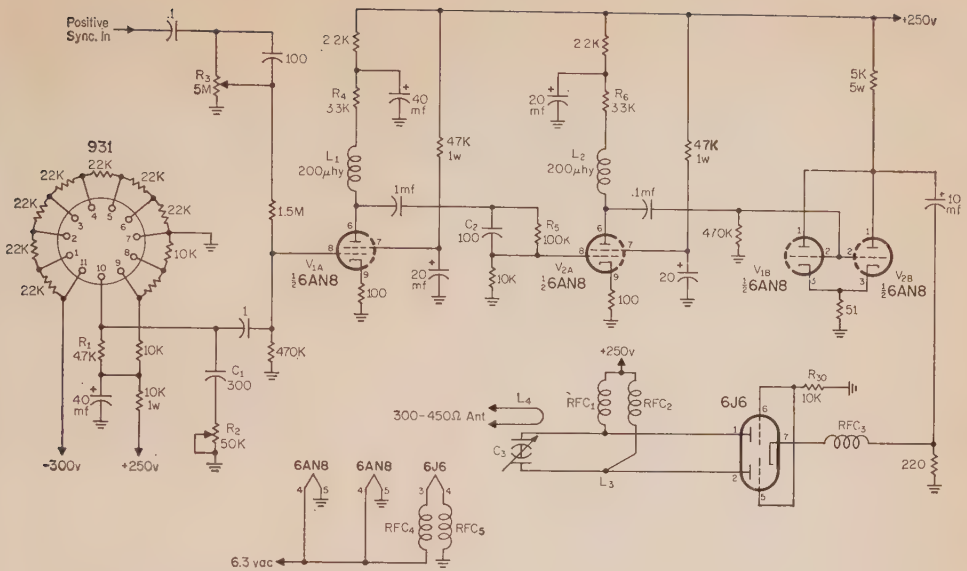


Fig. 1—Circuit of a simple TV transmitter employing a photo multiplier to scan the light source. All resistors are ½ watt unless otherwise noted.

C_3—5 mmf butterfly capacitor Johnson 160-203
L_3—4½" #12 spaced ⅜"
L_4—1" long loop #20, spaced ⅜"
RFC_1, RFC_2, RFC_3, RFC_4, RFC_5—12 t #22 close wound on a ½ watt high value resistor.

set. The waveforms are shown in fig. 2. This synchronizing signal from a TV set is mixed with the video at the first amplifier.

The sync signal does not affect the 931 whose actual scanning pattern is determined by the flying spot on the c.r.t. of the television set, but is provided for the receiver end where it is helpful in stabilizing the synchronization. The sync level control, R_3, is not a critical adjustment and is used to adjust the sync to between 50 and 100 volts peak to peak.

The 3300 ohm resistor (R_4) in series with a 200 microhenry coil (L_1) in the plate circuit of the amplifier stage (V_{1A}) produces a flat response from 10 cycles to 2.5 megacycles. To give the proper response to the second video amplifier and correct for additional phosphor decay, a 100K resistor (R_5) and 100 mmf capacitor (C_2) form a high peaking circuit which creates a streakfree picture. In the plate circuit of the second video amplifier stage, V_{2A} a 3300 ohm resistor (R_6) and a 200 microhenry coil (L_2) function the same as R_4 and L_1 in the first stage.

The triode halves of the two 6AN8's are used in parallel in order to pass approximately 26 ma which develops a 6 volt video signal across the 220 ohm cathode resistor of the 6J6 oscillator. This is sufficient signal to modulate the transmitter 100%.

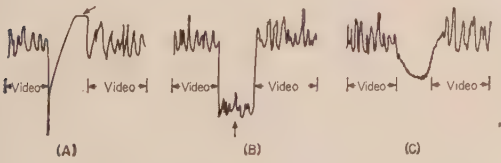


Fig. 2—Waveforms illustrating the function of the phosphor decay control. R_2. Waveform (A) is obtained with R_2 at maximum and will cause a vertical white streak to appear on the received picture caused by the heavily clipped pulse indicated by the arrow. Waveform (B) indicates the optimum setting of R_2. The arrow now points to the horizontal sync pulse. Waveform (C) will be obtained when R_2 is set at minimum. Note the loss of the sync pulse and picture detail. All waveforms taken with internal sweep of scope at 15,750 c.p.s. The correct setting for R_2 is where the white vertical line just disappears as the resistance is reduced.

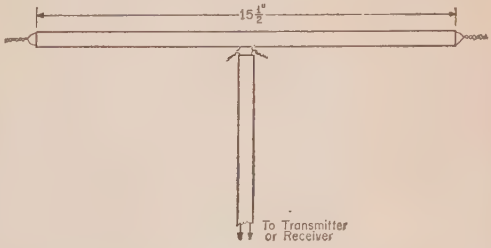
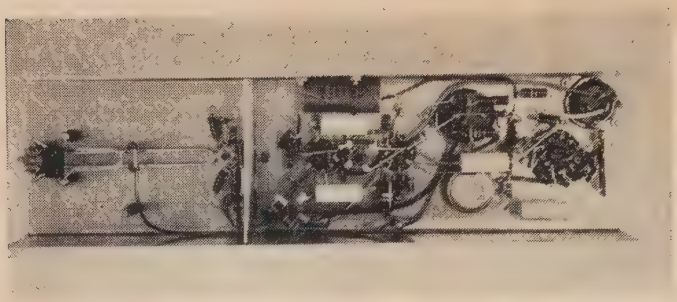


Fig. 3—A simple u.h.f. folded dipole for both transmitting and receiving. It should be fabricated from 300 ohm tubular twin lead. Bare ½ inch on each end, twist and solder. Cut bottom dipole wire in the center. Bare ¼ inch on each side and leadin end, twist and solder.



Bottom view of the TV transmitter. Note the shield between the oscillator and the video portion. The output loop is positioned snug against the oscillator plate lines.

The transmitter, a single 6J6, has an output of 1 to 2 watts depending on what portion of the band you are operating on. The low end, 420 mc, produces an output of 1 watt while the high end, 450 mc, produces 2 watts. The antenna coil, L_4, should be insulated with spaghetti and actually be in contact with L_3, the plate lines. The signal is radiated from the long lines (L_3) to the antenna coil (L_4) and via 300 or 450 ohm tranmission line to the antenna such as the one shown in fig. 3. More sophisticated antenna systems are available on the market if you choose to use them. A suitable power supply is shown in fig. 4.

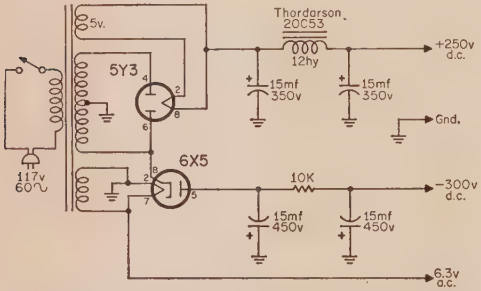


Fig. 4—Power supply for the TV transmitter. The power transformer is a Stancor PC-8404 or equivalent and L_1 is 12 h, Thordarson 20C53 or equivalent.

The keyway of the 931 photo multiplier must be oriented so that it may face the TV receiver used for transmitting. A standard split ring octal tube type of shield covers the 931 with the split aligned over the keyway. The shield should be sprayed black.

The positive synchronizing signal in the TV set is removed from either the sync separator or sync clipper by an adapter shown in the photograph. In order not to disrupt the sync signal, a low capacitance line (10 ft. of 300 ohm ribbon) connects the TV set to the u.h.f. transmitter. A simple modification prevents the normal picture from reaching the picture tube thus providing a lit, blank screen whose raster is still synchronized with the TV station. In some TV sets, that are capacitively coupled, merely disconnecting the output capacitor to the kinescope will do the job, while in direct coupled sets it may be necessary to disconnect the video output network and fasten it to B+. A typical arrangement of these changes is shown in fig. 5. In either case the only objective is to obtain a blank synchronized raster and to keep the brightness control operating. A simple transmit/receive switch may be incorporated in the TV set to accomplish this job. The brightness control thus acts as the gain control for the TV transmitter.

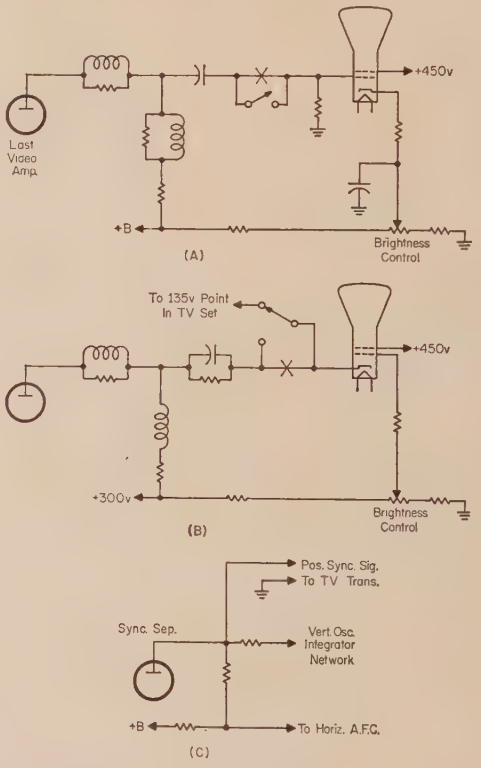


Fig. 5—Circuits of the modifications necessary in the transmitter TV set. Two basic coupling circuits encountered in TV output circuits are (A), capacitive coupling—Requires that you break the circuit at point X with a low capacity switch; (B) direct coupling—The cathode must be returned to a B plus point so as to maintain the original range of bias voltage. A variation in circuit (B) that is common is where the signal is fed to the grid of the c.r.t. rather than the cathode but the switching circuit is the same except that it is placed in the grid circuit. Circuit (C) illustrates the method of obtaining the positive sync pulses from the TV receiver.

Operation

The TV transmitter is placed 3 to 10 feet in front of the transmitting TV set and a strong signal from a local TV station is tuned in on this receiver. This provides the sync pulses for transmission as well as the raster. The TV receiver is then switched for a blank screen as shown in fig. 5.

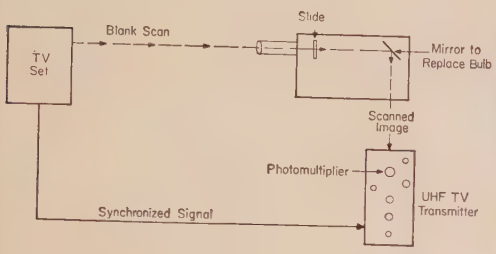


Fig. 6—Arrangement used to scan 35 mm slides.

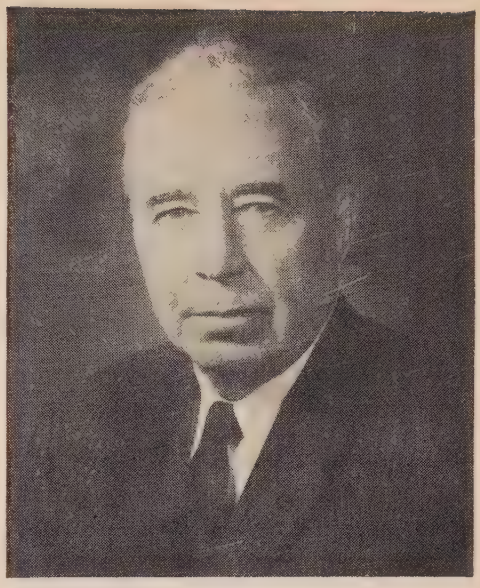
A message is written on the safety glass of the TV set using a china marking pencil and this message is scanned, multiplied and transmitted.

The ambient light level of the room is not critical. However, the lighting cannot be 60 cycles as it will modulate the 931. It is necessary, therefore, to operate in a darkened room after daylight hours. The monitoring receiver must also be kept in another room to prevent its raster from modulating the 931.

This simple adapter may be used to pick up the positive sync pulses from the TV set without wiring modifications.

The receiving end may be handled by any TV receiver equipped with a u.h.f. converter. The average converter will tune down below channel 14 and if not, a simple adjustment of the oscillator trimmer will permit it to do so. If necessary an inexpensive u.h.f. converter, such as those offered by Lafayette Radio for approximately $6.00, can be added to the receiver.

The TV transmitter radiates a fine quality picture. It can be adapted to scan 35 mm slides or transparencies as shown in fig. 6, or an experimental live pickup system can be used as described in the book entitled *Television*, by Morton and Zworykin (Wiley, 2nd Edition, 1954 page 238-39). ■



Andrew F. Schoeppel, 1894-1962

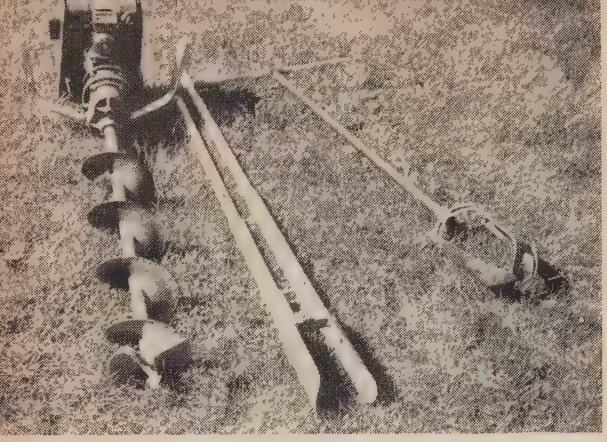
With the death of Senator Andrew F. Schoeppel on January 21, 1962, the Nation lost a distinguished public servant, and amateur radio a close friend and supporter.

Although not a radio amateur himself, Senator Schoeppel, Republican senator from Kansas for thirteen years, held the hobby in high esteem. When amateur radio needed a friend in Congress to support reciprocal licensing this past summer, "Andy," as the Senator was called by almost everyone who knew him, stepped forward to co-sponsor (with Senator Barry Goldwater of Arizona) Senate Bill S-2361. Introduced by the Senator in the Committee on Interstate and Foreign Commerce, this Bill proposes to amend the Communications Act of 1934, to grant amateur radio licenses to citizens of other countries on a reciprocal basis.

Andy Schoeppel was born on a Kansas farm on November 23, 1894. After serving in the Navy during World War I, he entered the University of Nebraska to study law. At Nebraska he was an outstanding athlete, and was one of the "Cornhuskers" who helped defeat Notre Dame and its famous "Four Horsemen" at football.

After receiving his law degree in 1922, the Senator began active participation in politics, which carried him from a County Attorney to the Governor of the state of Kansas in twenty years. In 1948 he was elected to the United States Senate, where he served until his death.

Senator Schoeppel was known to his colleagues as a man who believed in "saying what he meant and meaning what he said." The state of Kansas, the Nation, and amateur radio will miss him.



Tools for boring the hole. Left to right: Gas powered earth auger; Clamshell post hole digger; Hand powered earth auger, good in soft sand.

Beam Installation Techniques

BY MORTON WATERS*, W2JDL

LISTEN in on any of the DX bands and, if you don't already know it, you'll soon learn that the operator who snags the rare ones is using a beam. But even on short hauls, the inherent gain and directional effect of a beam can make the difference between a solid QSO and one plagued by QRM.

Deciding that you need a beam, however, is not the end of the road. You've not only got to buy or build one, but you've got to get it up there where it can go to work—which brings us to the tower. The number of types of towers is confusing and makes choice difficult. For your guidance, the following is a brief description of some of the more common varieties.

1. **Foldover/crank down.** Consists of two or more telescopic sections with built-in winch to hoist or lower the sections. A second winch, attached to the ground support, allows the telescoped tower to tilt over, bringing the tower head within reach of the ground where antenna adjustments can be made without climbing. This type is usually hinged at a point only a few feet above ground (see photos illustrating the installation of E-Z Way's model GP-HD-40).

2. **Foldover.** Consists of a permanently mounted fixed section, usually about 20 feet high, to which a second, longer section extending above and below the top of the fixed section is attached. It pivots at the top of the fixed part. A gin pole or derrick plus some climbing is necessary to erect this kind, but once the tower is up, the tilting mechanism is used to bring the head down for antenna adjustments. Rohn Manufacturing Co., Peoria, Ill., is the maker.

3. **Trolley on tower tracks.** Here we have what is basically a fixed tower. Erecting it calls for the use of gin pole or derrick and acrobatics. After the tower is up, additional climbing is necessary to install a set of guide rails which bolt to the side of the tower. A small trolley rides up and down on the rails, carrying the antenna with it. Therefore, after the erection is done, climbing is eliminated. Known as the Hy Track, the trolley/tower combination is a product of KTV Tower and Communications Equipment Co., Sullivan, Ill.

4. **The Fixed Tower.** Usually a number of short lengths (10 to 20 feet) which bolt together. Unless the full length tower is light enough to be walked into place after being assembled on the ground, a gin pole is necessary when erecting. Must be climbed when installing or adjusting antenna.

My own tower selection was dictated by my extreme distaste for heights. Get me up, even on a footstool, and my stomach flip-flops to the rhythm my knees beat out. But—aside from any personal allergy to height—the tiltover tower has the advantage of allowing you to

* 82 Boston Avenue, Massapequa, Long Island, New York

work in safety on the ground rather than atop a precarious perch. My choice was the E-Z Way model GP-HD-40, 40 feet high when fully extended.

Locating The Tower

Before starting to dig the hole for the base, survey the yard to find the best location. If you're using a foldover tower, make sure the site will give you enough clearance for the tilt. The space requirements of the GP-HD-40 are typical: six feet behind the ground post for the bottom of the tower (the part below the hinge); the top when laid down, needs at least 16 feet plus more for the antenna. Since the top of the quad is 8½ feet higher than the boom, I had to allow a minimum of 24½ feet clearance at this end. Sufficient lateral clear ance for the antenna elements must also be provided. The clearance distance will depend on the type and size of antenna.

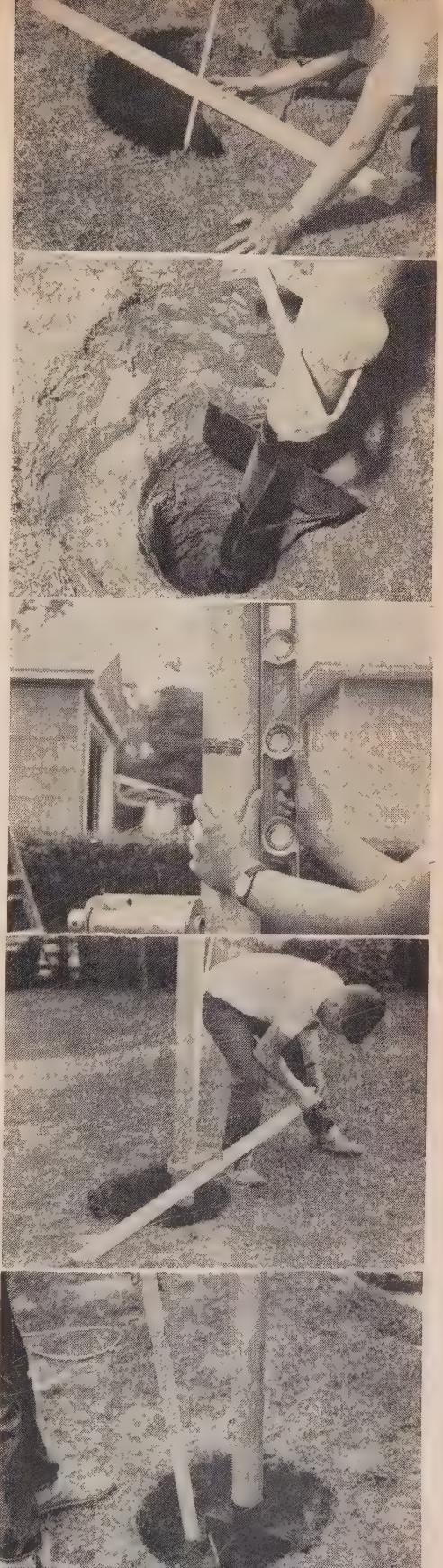
In the event the tower is to be guyed, pick a location from which guys can be extended and anchored conveniently.

As a final consideration, be sure that the antenna will not intrude on air space above a neighbor's property. In some areas this is interpreted as trespassing.

Getting To Work

The most difficult part of the entire job is the preparation of the foundation, or, with the fancy phrases removed, digging the hole for the tower base. Make no mistake about it; when you have to dig down 4½ feet or more and place a heavy piece of steel in the hole, you've got a job on your hands.

Fortunately for me, I was able to take the easy way out by finding a rental outfit that had a power-driven earth auger. However, if you're old fashioned—or unlucky—you can use pick and shovel. While the power auger will not actually remove all of the earth from the hole it digs, it will break up packed crusty soil faster than any other tool you can find. Once the soil is loosened by the auger, it is easily removed. In this case, I used a hand-held clamshell type post-hole digger to remove the loose earth. With the help of both tools, I was able to dig a 1 foot hole 4½ feet deep in 30 minutes. If the hole must be larger, make a series of bores in the area with the power auger, then break down the remaining solid



Hole depth can be measured accurately by laying a straight edge across the hole and reading the ruler. When deep enough, the tarred base is placed in the hole and carefully plumbed with a long level. Leverage, applied through a length of 2 × 4, can jockey post into position. Level carefully if you want a tower that doesn't look like it belongs in Pisa. When replacing the earth, tap frequently with the end of a 2 × 4. Moistening the soil lightly will help pack it down.

portions with a crowbar or shovel. Don't dig down any further than you have to. If you do so inadvertently, tamp the excess loosened soil firmly with a 2×2 or 2×4. Moisten it to help packing. Do not overwet or you'll wind up with a soupy, slurpy mess in the bottom of the hole that may take days to drain off.

Try to keep the sides of the hole as straight as possible. This will result in a stronger structure and will save labor by keeping the size of the hole to a minimum required. If the tower is to be placed in concrete, you'll probably have to dig a larger hole than is needed for the ground-post variety. The dimensions will vary, of course, with the tower but in every case the excavation *must* go below the frost line. (In the latitude of New York City, about 36″). Otherwise the tower footing may be badly heaved by alternate thawing and freezing of the ground, throwing the tower out of plumb or worse. Any local builder can tell you the frost line depth in your area. Make the hole about 6″ deeper than the tower requires and fill these 6″ with firmly tamped coarse gravel or crushed rock to provide drainage beneath the concrete.

Placing The Base

If the success or failure of this project can be said to hang on a single factor, this is it. The bottom section of the tower must be absolutely vertical. And, every step taken to insure this is a contribution towards a successful conclusion. Proceed as follows:

From 2×2 lumber, make four 2′ stakes with one end pointed. Notch one side of each stake 1 or 2 inches below the blunt end so that temporary rope guys will not slip off. Drive the stakes into the ground with a sledgehammer, spacing them equally around the hole about 8 feet from its edge. Next, place the tower base in the hole. (All metal which will be below grade, or covered with concrete, should first be given a coating of tar or asphalt waterproofing to prevent rust. Allow the tar to dry before proceeding.) Now, here is where the utmost care is needed. Prop the base in its approximate position temporarily and tie guy ropes from the topmost point of the base to the stakes. Get the longest carpenter's level you can find, but be sure it's at least 24″. A shorter level may cause an error which, although relatively minor at the base, may throw the top of the tower well out of plumb. Keep making adjustments to the guys, bit by bit until the base is exactly plumb. Always apply the level in two vertical planes, 90 degrees apart. Level and level again and again until those bubbles are right where they should be.

Once you are sure the base is plumb, you can start backfilling the hole. Replace a few inches of fill at a time, stopping frequently to tamp it down firmly and to check again with the level. Once the hole is about half full you can work more rapidly, for the base will have taken a set that will be difficult to change. A sprinkle of water on the loose fill will help it to pack down better, but, as has been said, don't overdo it. Wet mud is no good; damp earth packs best.

When using concrete for fill, pour about a foot at a time. Then work a small spade or scrap of wood up and down in the fresh concrete. This is called puddling and will remove air bubbles before the concrete gets a chance to trap them. Add concrete until the pour is at grade level. Stake some scrap boards around the opening and add a few more inches of concrete. When it starts to set, round off the top or trowel a slope into it so that rain will drain off.

After the concrete work is done, allow a couple of days before removing the temporary guys. During this period, wet down the concrete lightly once or twice each day to keep it from drying too rapidly. The longer the drying takes, the stronger the concrete will be. If there is danger of a freeze, cover the concrete with several layers of straw and burlap.

When the base post is set, the tower may be assembled. The winch for raising the mast section is shown being bolted in place. The tower is then mounted on the base and bolted to the hinge. After installing the base pulley and threading the pulley and winch, the tower may be cranked erect; a big moment.

In the event of a heavy rainfall while the concrete is still quite wet, cover the exposed surface with a piece of canvas to keep the rain from washing the concrete away.

Erecting The Tower

With the base finished, it's tower time. If the tower is of the telescoping variety, lay it on the ground and see if the sections move in and out freely. Now is the time to relieve any binds, not when the tower is up in the air.

Each type of tower needs different handling. Follow the manufacturer's assembly and erecting instructions and if, as part of the job, you must climb the tower, observe these rules:

1. Be careful.
2. Wear a safety belt, or tie a loop of heavy rope around your waist and around the tower.
3. Be careful.
4. Don't climb on a windy day or when it's not light enough for full vision.
5. Be careful.
6. Hold on.
7. Be careful.

The Beam

Your selection of the beam—the signal squirter—will, like the tower, depend on your personal preference and what your friends have told you. By and large, the gain and F/B ratios do not vary greatly from one type or brand to another—until you get up into the Rolls-Royce category. For this writer, the reputation and low cost of a 3 band quad made it the front runner. Another important factor was that it would allow me to use a light duty—and therefore lower priced tower—because of the antenna's minimum weight (under 30 lbs.). I was able to use a tower which, while low priced, could support the quad at 40 feet in 60 m.p.h. winds or 100 m.p.h. at 20 feet without guys. Note, however, that guying *is* recommended by the E-Z Way people if your area is subject to the unusual stresses and strains of ice or snow storms. The quad's light weight also permitted me to use a small, inexpensive rotator—the Cornell Dubilier AR-22, which has proved well able to handle the quad without excessive windmilling. On this tower, the rotator mounts above the tower top, clamping to a short length of pipe. In towers with larger cross-sections, the rotator is usually installed inside the tower head.

Assembling The Quad

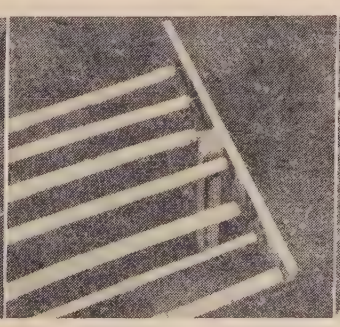
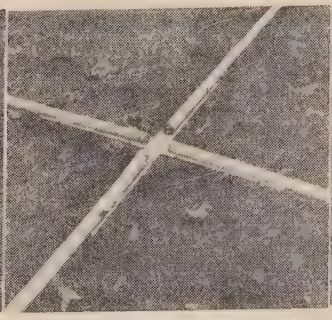
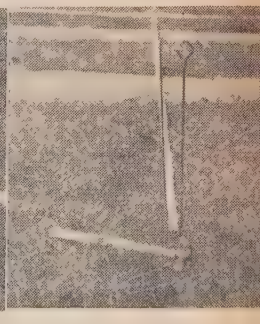
Whether you build a quad or buy a kit, the problems you face are identical, but with the kit, some of the work is done for you. Skylane's quad (seen here) as well as other brands, can be had in several degrees of cost and completeness. Basic (and cheapest) is a set of aluminum end spiders and boom support. You supply the rest. At the top of the line is the complete kit—wire, hardware and all—with either bamboo or, for about $40 more, fiberglass spreaders. The latter require no weatherproofing and have tremendous strength with inherent flexibility. The bamboo spreaders will also do the job but unless carefully treated will quickly dry out and crack. With the proper measures, the bamboos will last two or three years.

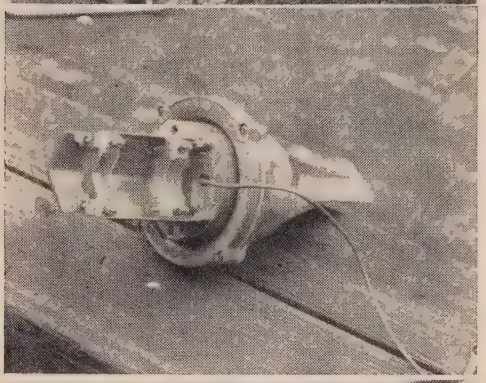
Treating the bamboo is easily done. Use a good grade of exterior synthetic enamel or epoxy varnish. In either case, apply at least two coats, more if you have the time. Allow sufficient drying time between coats.

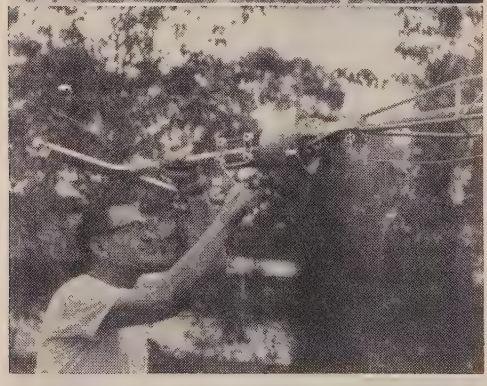
Painting bamboos 12½ feet long can get to be rather bothersome and sloppy unless you build a little jig. As shown in the photos, the jig consists of two boards with 3 inch nails driven through them. The bamboos are loosely impaled on the nail points, like the centers of a lathe. You dip your brush and apply it with one hand, while spinning the spreader with the other. Using this jig, a coat of varnish can be applied to all eight spreaders in 20 minutes.

When the paint is dry, lay one spider face down on the ground and position four bamboos

Assembly of the beam begins with weatherproofing the bamboo poles. The Rube Goldberg jig to support the bamboo for varnishing looks like nothing but works like great. Close up shows protruding nails. Place the bamboos on the spider to check hole alignment. If the fit is okay, turn the spider over and secure bamboos from underneath to prevent sag. To be sure of maintaining right angles, stake spreaders as explained in the text.





on it. Use galvanized hardware to fasten each bamboo to its respective spider arm. Be careful not to draw the nuts up too tightly, or the bamboo may crack. Dab tar or asphalt roofing compound on and around the hardware for corrosion and water-proofing.

Before beginning to string the elements, make sure that the spreaders are at right angles to each other. Use a large carpenter's square or the old 3-4-5 right triangle trick. Measure 3 feet on one spreader, 4 feet on an adjacent one. The distance between these points is 5 feet if the arms form a perfect right angle. Drive pegs or stakes into the ground to hold the arms in their correct positions.

The radiator and reflector elements of the Skylane quad use #14 solid enameled wire, and the power handling capacity is 1 kw. If your quad is to be a 3 bander with a single coax feed line, wire the 15 meter element in place first. Draw the wire tight enough to keep slack to a minimum but avoid bowing the spreaders. Although formulas vary somewhat, the one used here calls for 140 inches per side for a resonant frequency of 21.3 mc. The other elements, 102 inches per side for 10 meters and 204 inches for 20 meters, resonate at 28.6 mc and 14.2 mc respectively. All three radiators are tide together to a common female coax connector at the midpoint of the bottom of the quad.

Reflector lengths are identical, but each reflector is independent of the others. A small loading coil is soldered into each of the three at the midpoint of the bottom of the quad. These coils are close wound on one inch forms, using #14 enameled wire:

10 meters—6 turns
15 meters—4 turns
20 meters—5 turns

When the wiring is finished, examine the bamboos once more. Apply waterproofing to each piece of spreader hardware. Seal the hollow ends of each bamboo with caulking compound of the non-hardening type. Wrap each bamboo with plastic electrician's tape at every point where the elements are fastened to them.

If you haven't already done so, fasten the boom to the rotor. Finally, mount the quad on the boom, attach the RG-8/U coax, hoist the tower on high, tune up the rig and go to it—you're in the big league now! ■

After assembling the spreaders, the reflectors and directors are strung and the assemblies are clamped to the boom. The rotator, an AR-22, is shown ready to go with the control cable attached and the bottom plate on. The rotor is clamped to a short length of pipe above the tower and the boom support is clamped into the rotor. The boom is then clamped to its support T. Attach the coax feed line and up goes the tower, 40 feet, with the antenna pointed in the direction of DX.

An On The Air Timer

BY JACK MYERS*, W5KKB

This electronic timer, useful in long s.s.b. roundtables and nets, can be preset for any desired time interval and maintains high accuracy at any setting. Two versions are discussed.

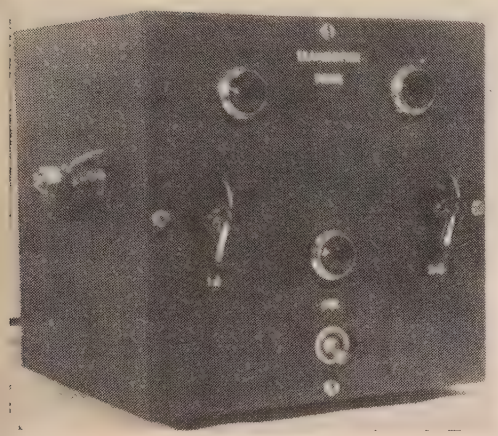


Photo of the deluxe timer, which incorporates two timers with a common power supply. The switch at the bottom of the front panel is the on-off switch with its pilot light directly above it. Each timer has its own pilot light with S_2 and S_3 below which select either R_1 and R_3 which are variable or R_2 and R_4 which are preset. R_1 and R_2 are visible on the left wall of the unit while R_3 and R_4 are located on the right wall.

THE timer shown was developed as a result of a rule of the Baton Rouge 21.3 mc Net, namely that transmissions should be limited to three minutes. This rule was initiated because it was found that people on a net have a tendency to talk too long. The 21.3 Net was formed solely for the purpose of rag-chewing, but with five stations each talking three minutes, each station gets to talk only every fifteen minutes. This is not very often, but before the three-minute rule it was sometimes thirty minutes or more between one station's transmissions.

Once the three-minute rule was adopted most members of the Net bought egg timers to keep track of how long they talked. This is very good except that one must remember to turn over the timer at the beginning of each transmission. The timer shown is completely automatic. A preset time after the control switch or push-to-talk is pressed, a warning light comes on. This timer is also useful to warn when it is time to give call letters if you talk over 10 minutes.

* 443 Centenary Drive, Baton Rouge 8, Louisiana

Circuit Operation

The circuit is shown in Figure 1. The basic timing is controlled by the resistor-condenser combination at the grid of the thyratron. A 6 volt a.c. or d.c. push-to-talk system is required for this circuit. The timer is connected across the p.t.t. switch so that a negative voltage is applied to the grid, which charges C_1. When the transmitter is put on transmit, diode CR_1 is grounded and C_1 discharges through resistor R_1. A negligible amount of current will flow backwards through the diode. When the voltage across the condenser drops to the firing voltage of the thyratron, it will conduct, lighting pilot light I_2. When the transmitter goes off the air, a negative voltage will again be applied to the grid and the light will go off immediately.

Note that any quick break in a transmission will reset the timer. In the case of the 21.3 Net, this was considered an advantage, since it discourages breaking back and forth between two stations. It was felt that a true roundtable should not have its pattern interrupted except by new stations breaking in.

The timer and control circuit shown are designed for 6 volts. However, other voltages may be used with slight modifications of the circuit. The component which must be changed is capacitor C_1. Its voltage rating should be changed in direct proportion to the voltage to be used and its capacity should be changed inversely to the voltage to be used. The capacitance is changed because the discharge time is nearly proportional to the voltage used and is exactly proportional to the capacitance. Thus changing the capacitance as indicated will keep the time constant.

The values given on the schematic give a maximum time of about 15 minutes. The time range may be changed as needed by changing the capacitance and/or resistance. Since electrolytics have a usual tolerance of $+100\%$ and -50%, there is not much use in calculating the exact values needed. Cut and try is much easier.

The Deluxe Version

A comparison of the picture and the schematic will reveal several differences which should be explained. The pictured version uses

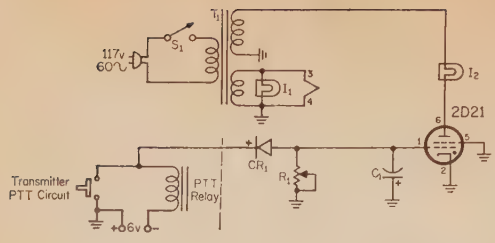


Fig. 1—Circuit of the basic timer unit showing connections to the push to talk circuit.

C_1—2000 mf 15 volt elec.
Cr_1—Silicon diode
I_1—Pilot lamp 6.3 volt.
I_2—Pilot lamp 110 volts.
R_1—2 meg potentiometer.
S_1—S.p.s.t. toggle switch.
T_1—Power transformer, 110 volt primary, secondary windings: 130 volts @ 30 ma and 6.3 volts @ .6 amps.

two timing circuits with a common power supply (fig. 2). The switch at the bottom of the front panel is the ON-OFF switch S_1 and pilot light (I_1) is directly above it. Each timer has a separate pilot light, the left one being amber and the right one being red. Below each of these lights is the rotary timing switch (S_2, S_3), corresponding to that light. The first position of each timing switch connects a potentiometer (R_1 or R_3) into the timing circuit. These pots have knobs on them and can be adjusted to any time interval needed. The second switch position selects a screwdriver adjust pot (R_2 or R_4). These pots are preset to a time of 2 minutes for the amber light I_2 and 2 minutes 50 seconds for the red light I_3.

Results

The accuracy of the timer seems to depend mostly on the heat. The first model was built on an open chassis and had an accuracy of about 3 seconds out of 3 minutes. The deluxe version has an accuracy of about 10 seconds out of 3 minutes.

Undoubtedly there are many other uses for this basic timing circuit. Its versatility could be increased by using a plate relay in place of the pilot light, which could in turn activate either a visual or aural alarm. It could also be used to protect tubes from the application of plate voltage until the filaments were heated. Of course there may be cheaper ways of doing the same thing, but not with the variable time feature. ■

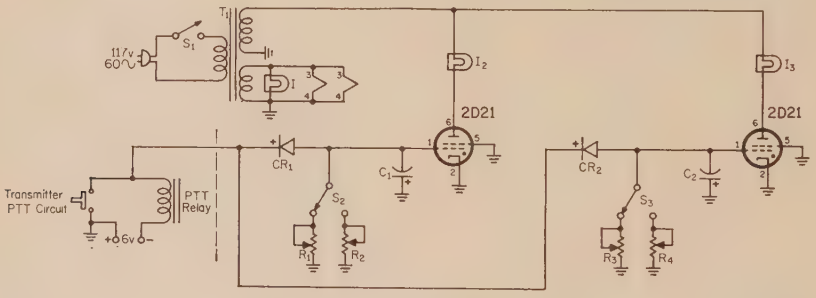


Fig. 2—Circuit of the deluxe version timer incorporating the control selector switches.

C_1, C_2—2000 mf 15 volt electrolytic.
CR_1, CR_2—Silicon diode
I_1—Pilot lamp 6.3 volt.
I_2, I_3—Pilot lamp 110 volt.
R_1, R_3—2 meg linear taper pot, with switch.
R_2, R_4—2 meg linear taper pot, screwdriver adjust.
S_1—S.p.s.t. toggle switch.
S_2, S_3—S.p.d.t. rotary switch.
T_1—Power transformer, 110 volt primary; secondary windings: 130 volts @ 60 ma and 6.3 volts @ 2 a.

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May 6 **Novel Developments in Station Equipment For Mars and Amateur Stations.** Robert Gunderson, Braille Technical Press.

Dxpedition To HV1CN

This view of St. Peter's Basilica can be seen from the operating position at HV1CN.

Operations From Vatican City During the CQ World-Wide (C.W.) DX Contest

BY LAWRENCE LeKASHMAN*, W9IOP

To describe a trip of this kind adequately would require a story teller on the level of O'Henry. Remember, in your earliest youth, standing in front of a magnificent toy store window decorated for the Christmas festivities and pretending the store is yours! If you can picture the flights of your imagination under those circumstances, then perhaps you can compare the feeling W8DUS and W9IOP experienced when they finally sat down to operate from this exotic prefix during the c.w. weekend of the World-Wide DX "test."

THE circumstances surrounding the trip to HV1CN are simple. Al, W8DUS, and I have been ardent DX'ers for many years. Occasionally, business requires our presence n Eruope. Since Vatican City represented one of the few European countries where operation was either non-existent or very limited, four years ago we tried on our own to obtain permission to operate from there and were referred o Maxwell Meyers, W2BIB. Subsequent to our first effort, through the liaison of W2BIB and Bill Halligan, W9AC and the Hallicrafters Company, Vatican Radio did put on an s.s.b./c.w. station at HV1CN, Vatican City. C.w. activity was extremely limited, simply because he license holder, I1CNS, Domenico Petti, had very little time (and *still* has very little time). Their principal mode when they were on the air was s.s.b. and c.w./s.s.b. whenever W2BIB, visited Vatican City. By invitation of W2BIB, and W9AC, our request to operate this year was granted, provided we observed the normal rules of amateur radio. There was an absolute minimum of red tape. Hospitality and courtesies extended to us were in the best traditions of amateur radio. As soon as we received permission to operate during the *CQ* World-Wide DX Contest, we completed plans for a business trip that we had been postponing and started to "mentally" operate HV1CN.

Strategy

I will be getting out of chronological order, but in restrospect, some of our thinking is amusing. The equipment at HV1CN required no additions, so it was merely a question of taking

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over those personal operating aids which a contest man considers essential. Al took his electronic keyer paddle. I took my Vibroplex and both of us took our personal headsets. Just prior to the trip the 40-meter dipole at HV1CN was struck by lightening and since they had difficulty in locating new coax, we added this to our baggage, in addition to several common receiving tubes which were also needed. We took a small tape recorder and an adequate supply of tape, feeling it would be interesting to do some recording in Europe to play back at club meetings in the United States. Of even greater significance, we "planned" exactly the type of operating, we were going to do. We worked out a sequence of giving the other stations call twice, a report and Zone number, his call again, and then signing our call. We agreed we would not work stations calling directly on our frequency; that we would dispense with all superfluous remarks or greetings and that we would make a studious effort to use all bands, even if it meant leaving a relatively hot band in order to try one of the low-frequencies. Our intentions were good but the actual circumstances of operating from a much sought after prefix, calls for improvising right on the spot, we were to find out.

Our flight to Rome was uneventful. Approximately fourteen hours after leaving Chicago, we were greeted at the Rome International Airport by I1CL and I1CNS. I1CNS, Domenico, is the license holder for HV1CN and a principal technician at the Vatican studio operation. I1CL is an official in the Italian Naval Office and a close friend of I1CNS. The cordial greeting of these two amateurs made us feel at home and in short order we were on our way to the Grand Hotel in Rome. This was Al's first experience being driven by a romantic European who looks upon the automobile as a divine instrument rather than a method of transportation and during most of the trip from the airport to Rome, Al claims he had his eyes closed. Running through his mind was the awful thought that we've come this distance only to be disabled in an automobile wreck before we could operate. These dire apprehensions did not materialize fortunately. At this point that we felt almost ashamed in comparing our approach to this expedition to the hardships of stout DX men who had braved tumultuous seas, scaled craggy mountains and endured all kinds of privations. Our accommodations at a first class hotel in Rome was comparable to what you would find at a similar establishment in a major U. S. city.

HV1CN

From the windows of HV1CN, we had an extraordinary panoramic view of the City. It is located in a setting so dramatic, you could easily be viewing the City from a helicopter. If you were to pick the ideal amateur location, you surely could not find a more magnificent location than this. The station itself is on the top of an ancient tower, accessible by taking two elevators a total of eight stories in the air.

A brief description of the equipment at HV1CN is of interest. The receivers were the Hallicrafter SX-101A and SX-115; the transmitter the Hallicrafter HT-32B and HT-33A amplifier was employed during half the contest. On 15, 40 and 80 meters, we used a simple dipole. On 20, a home-made three-element rotary beam was used. Most of the antennas are *below* the level of the station. Because of the very high tower housing HV1CN, wire antennas slope down from the top of the tower. The beam itself is mounted on a thirty-foot tower on the roof at the fourth floor level and is about seven stories above the ground. Since the station itself is on the eighth floor, you look *down* on the beam. The Hallicrafter equipment is surrounded by RCA commercial point-to-point microwave equipment. Regrettably, the large amount of commercial electronic equipment, from time-to-time, caused severe background interference on the amateur bands.

Wednesday Evening, November 22nd.

It was early evening in Rome, approximately 8 P.M., and we checked the bands to see how

W8DUS and W9IOP preparing to board their plane at Chicago. Fourteen non-stop hours later they were greeted by Domenico Petti, I1CNS, official licensee at HV1CN

they sounded. Twenty was completely dead. On 40 and 80 there appeared to be a considerable amount of amateur activity interspersed between European and Asian shortwave broadcasts, point-to-point commercial stations, Russian jammers and other miscellaneous signals. Since the 7 mc dipole was still not working, the only open band was 80. We tuned the HT-32 and HT-33 and in the few minutes available, both Al and I took turns operating. The results were a little short of extraordinary. Both of us had a mental image of 80 sparsely occupied by a few Europeans that we occasionally hear across the Atlantic during a DX contest. This couldn't have been further from the facts. Immediately, dozens of excellent signals were calling us. I worked a half a dozen stations, Al sat down and worked a half a dozen stations and then with regret we had to send a general call that we would be on during the entire DX contest, anxious to work everyone, and had to QRT. Since signals on 80 and 40 generally sounded crisp and the bands were active, we were not too apprehensive about conditions during the contest, although the complete absence of signals on 20, particularly, since it was only mid-afternoon in the United States, was disappointing. On Thursday, we were otherwise occupied and did not get back to the station.

This fold-over QSL card was sent to all stations during the CQ W. W. DX Contest. Totals: 758 worked on phone; 1,986 worked on c.w. Impressive?

Friday, November 24

At nine P.M., Rome time (one hour ahead of GMT) the Swiss guards ushered us into the Vatican grounds. We went through our elevator routine and made ourselves comfortable for the next several days. A brief word about the facilities. Domenico had provided us with an electric stove and we had an ample supply of instant coffee and crackers, candy and similar refreshments. We also had a beach chair, for catnaps, hidden behind the microwave transmitters which provided some additional heat. It was our plan to go out for meals, the operator not on duty during the day, would have no trouble going into Rome for regular refreshments. As it turned out, we were so busy operating and so excited about the entire operation that Al and I did this only once during the two days.

We actually started transmission on 7 mc on Friday at 2100 GMT. Everything was in working order, the 7 mc dipole had been repaired and I was given the opportunity to call the first forty meter CQ. Picking a spot that seemed clear of commercial interference, about 7010 kc, my first CQ (and incidentally our *only* one) brought perhaps a dozen or more replies, all of them extremely strong signals and indicating good European coverage. The band "smelt" good. Signals were crisp, the air outside was brisk and cold and regardless of what might ultimately happen in the contest, we now felt that we were all set to go. I might mention we had a schedule with our homes on Thursday, Thanksgiving afternoon, and the band was absolutely dead. This caused us considerable apprehension over the conditions we might encounter. However, the Vatican propagation forecaster advised conditions would be fairly good, possibly just slightly below normal. Within twenty minutes after my first CQ, among the beautiful signals calling us were Ws, loads of them, just below the strong level of Europeans. It was still only shortly after four O'clock EST, in other words, still full daylight on the East Coast and this was a wonderful omen.

My first couple of QSOs, since we were not yet in the contest, consisted of introducing myself, giving my name, telling the station where to QSL and generally making small talk. By the third QSO I was giving only my name, by the sixth QSO, I was doing a little more than handing out a report and trying to get on with the next QSO. After a short period of this completely new experience . . . Al sat down and went through precisely the same experience. Wave after wave of stations were calling us. We were really like two kids. Old friends would call and I would holler at the top of my lungs, "W8JIN and, of course, the same thing went on with Al calling me, "here's Bob, here's Pete, here's W2GUM; Tony sends his regards," it was really turmoil . . . excitement at a white-hot fever pitch.

For a while we sat there with two sets of headsets to see how practical it might be to have one man operate and the other man log. In a very few moments it became obvious how absurd this idea was. With a dozen or more stations calling simultaneously and two experienced c.w. operators listening, you can im-

W9IOP and W8DUS, famed contest enthusiasts, turned the tables during the CQ World-Wide DX Contest on November 25-27, 1961. Pictured is Larry, at the Hallicrafters equipped station, dropping a net over a hungry wolf-packer.

agine what happened. I wrote down one call, Al wrote down another; I wrote down four or five stations, Al wrote down four or five stations and you would think we were at two different operating positions, neither one of us had been listening to the same stations calling. We immediately decided the operator would have to do his own logging!

Achieving Best Results

We were running a kilowatt and the results lead us into some difficulty later on when we had to operate at reduced power to avoid interference with Vatican facilities at certain hours. Because we had a very excellent signal, the fact we worked stations on our own frequency, was not troublesome. When we came back to a particular station, our signal was sufficiently strong that despite continuous QRM from stations calling while we were transmitting there were very infrequent requests for a repeat. Later on, when we were running 150 watts, we had serious trouble with stations calling on our frequency and did not realize it until too late to do anything about it. We did not have good facilities to monitor our sending and as a consequence, our lovely plan to listen 5 kc off our frequency went out the window. As a matter of fact, I didn't quite realize that I was using the receiver as a monitor and when the QRM level started to build up to a crescendo Friday night, I asked everybody to QSY 5 kc. There was a tremendous "swish" on the band and sure enough everybody was calling 5 kc up. To my chagrin I simply couldn't work them because I couldn't monitor my sending and had to ask everybody to come back down to my frequency. When we had high power, operating on our frequency, presented absolutely no problems, but when we went to low power, it was a source of considerable confusion and concern and taught us a lesson for any future activities of this type.

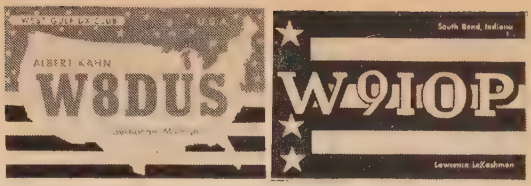
One of the bands was open at all times during the contest. We did not have antenna facilities to work 10, although a number of DX stations advised us that 10 meters was open during the contest. The only disappointment for us were the relatively sparse openings to the midwest and western part of the United States. We could hear these stations calling, particularly, on 40 meters, but hopelessly underneath the blanket of QRM, not only from the U. S. East Coast, but from Europe and the Near East. Several futile attempts to call directional CQs produced very unsatisfactory performance on the band. A CQ fifth-district produced SM5, UB5, G5, DL5, YO5, and countless others. We simply had to struggle to pull through the weaker Americans and every once in a while we were able to hand out a QSO to a Westerner. Operating from Europe gives very dramatic evidence of how rapidly American signals fall off as we move across the United States. It was not possible to make a comparison on 80 since this band was dead except for Europeans and the Near East. On 40, signals beyond Illinois were extremely weak in comparison to the East Coast. A few of the W8s had competitive signals, particularly, those with full size rotary beams, but the sad truth is that the East Coast r.f. curtain is a fact.

Al and I were constantly calling one another to listen to some particular American signal that sounded like a local. In retrospect, we were most fortunate that these openings did occur because it might have been a repetition of the previous phone weekend when they had no satisfactory openings to North America. We were surprised by the great lack of activity in certain parts of the world. We worked only a handful of Africans, yet those we did work had excellent signals which would indicate not so much poor conditions, but simply inactivity. We worked volumes of European Russians, but few Asiatic Russians. The Pacific, which is the most difficult general area to work from Europe, we have been told, was not fruitful although we did work a number of countries and a number of the better known DX men. Perhaps one of the experiences that most brought home to us the unique situation we were in was when VU2TH thanked Al for giving him a QSO with a "rare one."

Operating Techniques

The obvious question arises, "what about operating techniques?" What about tail-ending or stations calling while we were working other stations, and so forth? Al and I agree that the stations worked were of a uniformly high caliber. Perhaps we just didn't work the lids because they couldn't compete with the good operators, but certainly there was no particular part of the world, no particular segment of amateur population that showed a uniformly greater or lesser degree of skill. It was our consensus that "tail ending," particularly under proper circumstances materially speeded up our operation. When conditions were good to a particular part of the world and with the general level of signals reasonable, tail-ending worked out beautifully. As soon as we finished one contact we were ready with another. Where

Al and Larry dish these cards out when they're back home.



we got into difficulty with tail-ending was when there was a great disparity between signals. For example, when the Europeans were S9 plus and the Americans were running S5. When we were working a European under these conditions, there was no possibility of copying a tail-ending W beneath his signal. A good rule to follow is *not* to attempt to tail-end if there is *both* long and short skip in effect at the same time. If either long or only short skip prevails, then legal tail ending is fully acceptable. I say "legal tail-ending" because there is nothing wrong with the calling station sending our call very fast and then repeatedly signing his call.

If we were to categorize our complaints, the biggest and most serious one, was the peculiar practice of calling stations who insisted upon sending our call repeatedly before signing their own. It was a reasonable assumption that almost anybody in the pileup on our frequency was calling HV1CN. With a large number of signals calling us, our first problem was to identify the station, to isolate him from the pack, so when he signed his call, we could copy him. At times we were perfectly content to copy one or two letters from a call. Both Al and I were assisted by the fact that we're familiar with thousands of stations and if we heard just several letters of a call, frequently could guess who was calling us. Imagine our chagrin, time and time again, when in the pileup, all we could hear was *our own call*. By the time calling stations got around to signing their call, the roof would cave in with others moving in on the frequency. On rare occasions we would call a QRZ and the very same stations would come back again calling HV1CN repeatedly. The operator who gave our call just once to meet the legal requirements and then signed his own call three or four times was way ahead of the crowd and we worked him! The other complaint we might register, relatively minor, was the insistence of some fellows to extend the QSO beyond the exchange of necessities. One chap started to apologize because he was not in the contest. Another started a brief discussion of where we were located. Fortunately, these cases were quite isolated, quite likely the result of innocent thoughtlessness.

In Retrospect

At one time I tried an experiment, going back to two stations at a time. It became obvious that if we could copy two calling stations, we should have no trouble copying their message at the same time. It was a good idea but apparently caused more confusion on the other end than it was worth.

With this activity under our belt, Al and I are convinced that we could have significantly raised our QSO average by improving some of our techniques. Most obviously was the need for an excellent monitor so that we could work off our frequency. We felt also that complete break-in is a necessity. We did not have the HT-32 operating break-in during the contest and the necessity of going through the physical motions of throwing a switch probably cut our efficiency 20%. Despite these problems, we averaged about 50 QSO's per hour during the entire contest. Regrettably we had to QRT Sunday evening at nine-thirty P.M., Vatican City time, when the band was still open to the United States on 20 and quite likely would have stayed open on 40 for the remainder of the contest. We had to catch an early morning flight to Paris and one of the traditions of Vatican City was working against us. At ten thirty, every night, for centuries, the steel gates are closed and one can neither enter nor leave Vatican City until morning. It's too bad we didn't get my picture sitting at the table frantically trying to work Ws with my hat and coat on, packed and ready to leave, with W8DUS and I1CNS pulling at my coat tails. It was under these less-than-ideal circumstances that I was in QSO with my own station. During these last few minutes I was operating and heard somebody make the remark, "my God, he's not even going to work his own station." I'd heard W9IOP in there, but at various times during the contest enthusiastic amateurs would call either W8DUS or W9IOP instead of HV1CN and I thought this was just another instance of that tomfoolery.

One thing is self-evident. The starting and ending time period for the contest is inappropriate and discourages participation by many DX stations. A contest that starts at two A.M. in the morning and ends at two A.M. in the morning means that those who live by GMT are not very likely to be interested in participation. It will be our strong recommendation that these rules be changed for the next contest so that it starts at a more sensible hour for the European participants. There is no reason why it could not start earlier. The disadvantage that our brethren on the West Coast are possibly missing several hours on Friday afternoon could be offset easily by far greater activity throughout the world. Another solution would be to permit the various time zones in the United States to start and end at different times. This would make an interesting variation and might give the Central, Mountain and Pacific time zones a much fairer crack at some of the rare countries, especially Europe. ■

A Florida Rock Crusher

Using the 6C21 in a Tuned Cathode 1 kw Linear

BY EARL CARTER*, W4YHW

The 6C21 was designed for use as a radar pulse amplifier and serves nobly as a kw final. This unit operates from 10 to 80 meters and loafs along at a kilowatt.

WITH most present day exciters in the 100 watt output class, grounded grid triodes seem to be the logical choice for high power finals. In addition to the triode's lower cost, circuitry can be simplified by the elimination of regulated screen supplies and associated overload circuits.

The amplifier described here has been in use at W4YHW since December 1959. A 6C21 is used in the final although a 450TH can be substituted. The tube is operated in grounded grid configuration, eliminating the need for swamping. Any of the popular 100 watt exciters will drive it to well over 1 kw input on s.s.b. or c.w.

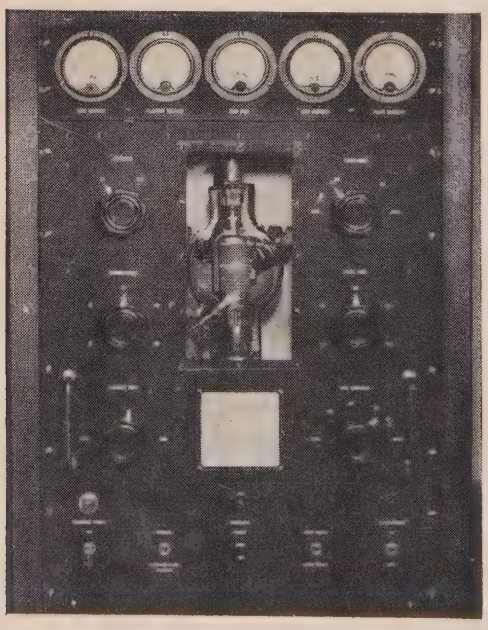
The Tube

The 6C21 is a radar pulse tube with an amplification factor of 30, which is slightly less than the 450TH. Filament requirements are 8.2 volts at 17 amps. However, for r.f. service 7.5 volts at 15 amps is adequate. For all practical purposes the specifications for the 450TH can be used. New 6C21's are available from most surplus houses for about $15.00[1]. They were made by several manufacturers including Machlett, Eimac, Westinghouse and General Electric. An engineer employed by Machlett indicated a conservative plate dissipation of 450 watts. Our estimate is about 600 watts. In any event they will loaf along at 1 kw input. In our opinion these husky triodes are one of the finest buys on the surplus market. (Amateur net on the 450TH is $75.00.)

After many years of storage these tubes tend to become gassy. The tube should be operated with filament voltage only, for about an hour, before plate voltage is applied. Our experience with 4 new 6C21's showed 3 of them to be gassy when taken out of the crate. This was evident by the tube turning blue and the plate supply overload relay kicking out when plate voltage was applied. However, all of them checked out as good as new after a short "cooking" period with only the filament voltage connected.

* 910 Oriole Drive, Miami Springs, Florida

[1] U.N. Electronics Inc., 3915 N.W. 25th St., Miami, Fla., sells them in factory sealed cartons for $15.00.



Front view of the KW final. The upper left control connects to a B&W 551A Coaxial switch mounted on the rear and switches the amplifier in or out of the circuit. Left center control is the Cathode Bandswitch. The lower left control is the Cathode Tank Tuning Capacitor. The upper right control is the Plate Tank Tuning Capacitor; right center is the Plate Bandswitch and lower right is the Antenna Coupling control. The meters are, from l to r, line voltage, filament voltage, grid bias, grid current and plate current. The tube is viewed through ¼" plexiglass.

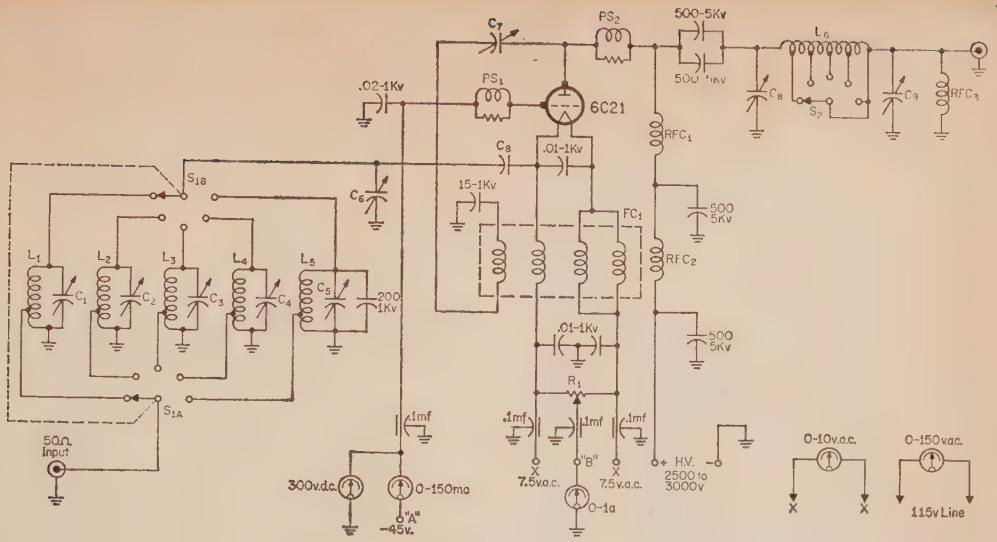


Fig. 1—Circuit of a g.g. kw amplifier. Coaxial capacitors marked 0.1 are Sprague Hypass 80P3. Capacitors marked 500 5 kv are CRL 8585-500.

C_1, C_2, C_3, C_4, C_5—100 mmf, Johnson 100R12.
C_6—300 mmf, Bud MC1860 or equiv.
C_7—1.7 to 10.7 mmf neutralizing capacitor. Johnson N375 or equiv.
C_8—31 to 151 mmf, 0.175 inch spacing. Johnson 150D70 or equiv.
C_9—50 to 1500 mmf. Cardwell PL-8013 or equiv.
FC_1—B & W FC-30.
L_1—28 mc, 4 t #12, ⅝" diam., 1½" long, tapped ¼ t from top.
L_2—21 mc, 5 t #12, ⅝" diam., 1½" long, tapped ¾ t from top.
L_3—14 mc, 9 t #12, ⅝" diam., 2" long, tapped 4 t from top.
L_4—7 mc, 20 t #16, ¾" diam., 2" long, tapped 10 t from top.
L_5—3.5 mc, 34 t #18, 1" diam., 2" long, tapped 13 t from top.
L_6—B&W 850A pi-network.
PS_1—8t #12, ½ d. 2" long shunted with 9 100 ohm 2W carbon resistors in parallel. Tot. res. 10 ohms.
PS_2—3½ t #12, ⅜ d. 1¼" long shunted with 9 470 ohm 2W carbon resistors in parallel. Tot. res. 50 ohms.
R_1—25 ohms, 50w, center tapped.
RFC_1—B&W 800 plate choke.
RFC_2—20 t #16, ⅜" diam., 1" long.
RFC_3—1 mh, 300 ma. National R 300 or equiv.
S_1—2 pole 5 pos. CRL 2552 or equiv.
S_2—Part of L_6.

The Circuit

Conventional pi-network output is used in the plate circuit shown in fig. 1. The cathode circuit is tuned and there is a separate tank circuit for each of the ham bands. By tuning the cathode circuit, efficiency is increased and drive requirements are lowered. Equally important, it provides a convenient way to present a 52 ohm load to the exciter. The amplifier is neutralized by the field expedient method, this was found necessary for 10 and 15 meter operation. Having had a B&W FC30 filament choke on hand we incorporated this in the neutralization circuit rather than wind separate filament coils. The B&W FC30 is actually 4 chokes in one can. Two of these are tied together and feed one filament leg. One choke is used to feed the other filament leg. Neutralization voltage is fed through capacitor C_7 into the unused filament choke.

Construction

The unit is built on a 17 × 13 × 4 inch chassis, parts layout can be seen in the photos. All of the components for the cathode circuit except C_6 are mounted in a 12 × 7 × 3 inch chassis set vertically on the main chassis.

To keep panel height to a minimum, the socket for the 6C21 is mounted flush with the chassis. This also provides excellent shielding between input and output circuits. Loading capacitor C_9 is in a shielded compartment formed by mounting a 4 inch aluminum partition from front to rear on the underside of the chassis.

The entire amplifier is enclosed in Reynolds do it yourself aluminum. The framework for the enclosure is made of ¾ inch aluminum angle. All leads passing through the chassis are bypassed with coaxial capacitors.

A series of ¾ inch holes are punched around the tube socket. The chassis is pressurized by a blower mounted in the top of the relay rack. The blower intake is covered by a spun glass air conditioner filter to remove dust and dirt. A 6 inch hole is cut in the top cover directly over the tube and covered with decorative aluminum screen. The 2 inch air fitting and elbow on the rear of the chassis can be purchased in most hardware stores. They are known as a closet spud and flush elbow. A length of 2 inch automotive defroster hose is used to connect the blower to the chassis.

Due to the large physical size of the tube, very little forced air cooling is required. Fifteen

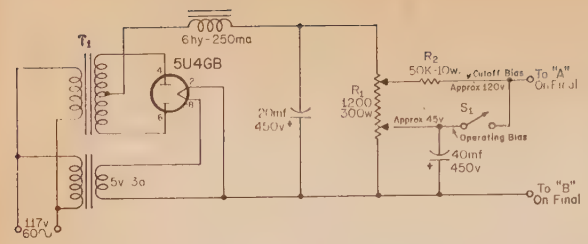


Fig. 2—A suitable bias supply for the final amplifier. An electronically regulated unit may be used rather than heavily load circuit shown above. Contacts S_1 are part of the antenna relay and are open on standby. Transformer T_1 should supply 800 v.c.t. at 250 ma.

to twenty-five CFM is adequate. This may be supplied by a small fan or blower mounted so that at least 2½ CFM is forced up through the base of the tube. It is recommended that heat dissipating plate and grid connectors be used. All four socket terminals are used for the filament. Pins 2 and 3 are paralleled for one connection and pins 1 and 4 for the other connection. A suitable socket is the E. F. Johnson Co.'s number 123-211 or equivalent.

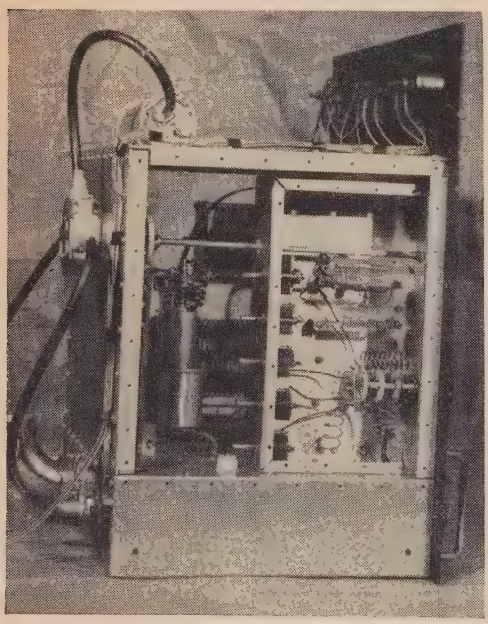
A B&W 551A coaxial switch is mounted on the rear of the unit. A long shaft and flexible coupling are used to bring this control out to the front panel. This allows the amplifier to be switched in or out of the circuit at will.

The 5 × 10 inch cutout in the center of the panel is covered with ¼ inch plexiglass. This cutout is of course optional and can be left to the discretion of the builder. However there is no better indication of resonance, or lack of it than the color of the plate.

For operating convenience all circuits are separately metered. The meters are mounted in a standard 5¼ inch meter panel which is placed above the amplifier.

To keep r.f. losses at a minimum all plate and pi-network connections are made with ½ inch copper strap.

If a center tapped filament transformer is available resistor R_1 can be eliminated. The plate current meter should then be connected to the transformer center tap.



Left side view of the KW final. The vertical chassis contains the cathode input tank circuits. Capacitor C_6 is located under the main chassis. The input coils are spaced as far apart as possible to prevent interaction. The bandset capacitors may be adjusted through holes in the rear shield. The ¼" shaft and flexible coupler connect to the coaxial switch mounted on the rear. The neutralizing capacitor is mounted near the rear of the unit.

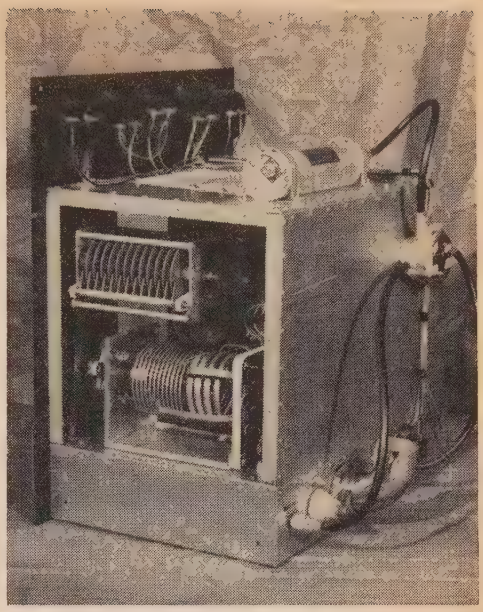
Tune Up and Adjustment

The neutralization adjustment is made on 28 mc and will be correct for the other bands. Connect the output to a dummy load and set C_7 fully open. Apply reduced plate voltage and adjust the grid bias for a plate current of 80 ma. With loading capacitor C_9 fully meshed, slowly tune C_8 from minimum to maximum capacity. At one point the plate current will increase and grid current will flow. Using an insulated screwdriver adjust the neutralizing capacitor C_7 for zero grid current. Repeat this procedure with various settings of C_9. As a final check go through the above procedure with full plate voltage applied and bias reduced for a static plate current of about 160 ma. Caution, High Voltage!

The output from the exciter is fed to a tap on the cathode coil which represents 52 ohms. The location of the tap is contained in the coil table. However it may be checked as follows. Load the amplifier to about 1 kw input and peak C_6 for maximum drive. With a s.w.r. bridge connected between the exciter and amplifier, adjust the tap on the coil for a 1 to 1 s.w.r.

With C_6 set to mid capacity, the individual trimmers are adjusted for maximum grid drive at the center of each band. When changing bands it is only necessary to rock C_6 slightly for maximum drive.

With 2700 volts on the plate, grid bias should be adjusted for an idling current of 80 ma. This will be approximately 45 volts of negative bias. Checks made using a 2 tone generator and oscilloscope showed the following results. With idling current set to 80 ma no noticeable crossover distortion was evident. Crossover distortion became noticeable when idling current



Right side view of the KW final. The B&W pi-network can be seen mounted on the chassis. Above this is the plate tuning capacitor. The air inlet may be seen on the rear of the chassis. A Johnson low pass filter is mounted atop the unit.

was lowered to 60 ma. If the amplifier is loaded heavy enough to hold single tone (c.w.) grid current to a maximum of 100 ma, no flat topping will occur. Flat topping became noticeable with light loading when grid current was allowed to exceed 120 ma. Loading is increased to the point where r.f. output just starts to drop off. At this point the grid current will be about 100 ma and the plate current about 450 ma. An r.f. output indicator was not included in the amplifier, nor has it been found necessary. However we have an s.w.r. bridge in the rack and monitor forward power.

The Bias Supply

Due to the large amount of grid current drawn by the 6C21 it is important that the bias supply have good regulation. This can be achieved by the use of an electronically regulated supply or by using a conventional supply that is heavily loaded. We used the latter, as shown in fig. 2, because husky surplus components were on hand. If this type of supply is used, bleeder current should be at least 200 ma. During standby the grid voltage is increased to about 120 volts. This is sufficient to drive the tube beyond cutoff. As can be seen in the schematic, cutoff bias is supplied to the grid of the 6C21 through resistor R_2. Contacts on the coaxial antenna relay short this resistor to the tap on R_1 which supplies the operating bias.

The positive terminal of the bias supply is connected to the filament center tap. This results in the plate current meter reading true plate current and not a combination of plate and grid current.

The Plate Supply

Any power supply delivering approximately 2500 volts at 400 to 500 ma is suitable for the plate supply. Ours is constructed of surplus components and delivers 2700 volts under load. We included an overload relay because one was on hand. This is a desirable feature but not at all necessary. Construction details are not included as the supply is conventional in every respect. Similar supplies will be found in any of the handbooks.

Conclusion

Using a 32S-1 as an exciter on 14 mc, measured single tone power output was 880 watts including feed through power. This was with 100 ma grid current, 450 ma plate current and 2700 volts on the plate. Total combined input under these conditions is approximately 1375 watts. At voice frequencies peak power output will be about 10% greater due to power supply regulation. To comply with FCC regulations excitation should be reduced so that the combined input of the exciter and amplifier does not exceed 1 kw when operating c.w. or R.T.T.Y.

Checks made with the shielding removed and a portable TV set operating alongside of the amplifier showed no trace of T.V.I. Originally we had intended to insert an aluminum screen between the plexiglass and the front panel, however this was found to be unnecessary.

Having gone through a miniaturization "kick" with underrated and overheated components, no attempt at miniaturization was made in the construction of this amplifier. For those interested in R.T.T.Y. this amplifier is capable of running 1 kw input under continuous key down conditions. This conservative design has also paid off in reliability. In over 24 months of operation and better than 100 countries worked on s.s.b. no service or maintenance has been required. ■

"Y' know, I am trying to figure why that shape is familiar . . ."

The EICO 730 Modulator-Driver Kit

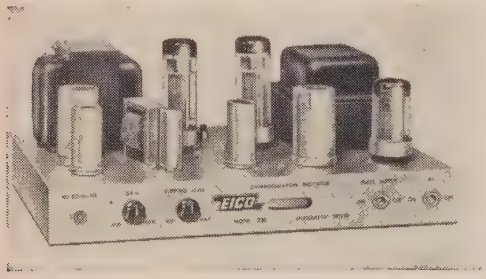
BY LEE AURICK*, K3QAX

THE EICO 730 Modulator-Driver Kit will be of interest to amateurs who have constructed either commercial or "home-brewed" c.w. transmitters in the 50 to 100 watt power level, and who would now like to modulate them as economically as possible. The 730 may also be used as a flexible, low-impedance driver for a class B high-power modulator; for a variety of impedances may be matched by the multi-match output transformer including loads between 500 and 10,000 ohms.

A unique over-modulation indicator as well as low-level speech clipping and filtering make the 730 a particularly useful addition to the shack. Two separate inputs accommodate crystal and dynamic microphones, or low impedance devices such as phone patchs and tape recorders.

Front panel controls include: GAIN, CLIPPING (level), PLATE (supply) switch, and A.C. switch. A cathode-ray tube, an EM84, functions as the over-modulation indicator, and it too is mounted on the front panel, as is the microphone connector.

*Mt. Pleasant Rd. RFD#1 Columbia, Pa.



Front view of the Eico 730 Modulator-Driver. The front panel contains, from l to r, Microphone Input, Gain, Clipping Level, Overmodulation Indicator. Plate Supply On-Off, A.C. On-Off. The tube line up from l to r is, 12AX7, 6AL5, 6AN8, GZ34 with the two EL34's to the rear. The transformer on the left is the modulation transformer and the choke in front of it is part of the low pass filter in the clipper circuit.

Circuit

The 730 incorporates five tubes not including the rectifier and over-modulation indicator.

A 12AX7 serves as the microphone pre-amplifier, with the gain control, R_4, located in the second stage grid circuit. Low frequency attenuation is provided by the small value of C_2, the interstage coupling capacitor. Phone patch input is available in the cathode of the second half of this stage. With the gain control turned to minimum, the tube operates as a grounded grid amplifier. An r.f. filter, R_1 C_1, limits the possibility of r.f. feedback into the modulator.

A 6AL5 serves as a series type clipper with the clipping level controlled by R_9, which varies the diode plate voltage in a voltage divider network. The output of the clipper is fed to L_1, C_5 and C_6, a low pass filter, which suppresses the harmonics generated by the peak clipping action of the diode. The clipper may be adjusted for any desired level of clipping, as indicated on the over-modulation indicator. As a result of this clipping, a higher average level of modulation may be employed without the spurious sidebands and increased bandwidth that would otherwise be present. EICO claims that the effective speech level of the signal is raised 8 to 12 db. There is little doubt that the reports of tremendous audio punch received when using a 75 watt rig modulated with this unit have been due primarily to this clipping action.

A 6AN8 is the actual driver stage in the modulator. The pentode section is the voltage amplifier and is directly coupled to the grid of the triode section which operates as a phase inverter to split the signal before it is fed to the grids of the output stage tubes. Negative feedback from the output transformer secondary to the cathode of the pentode section provides an effective means of stabilizing the performance of the modulator output.

A pair of EL34 audio power amplifier tubes are operated class AB1 in the push-pull output

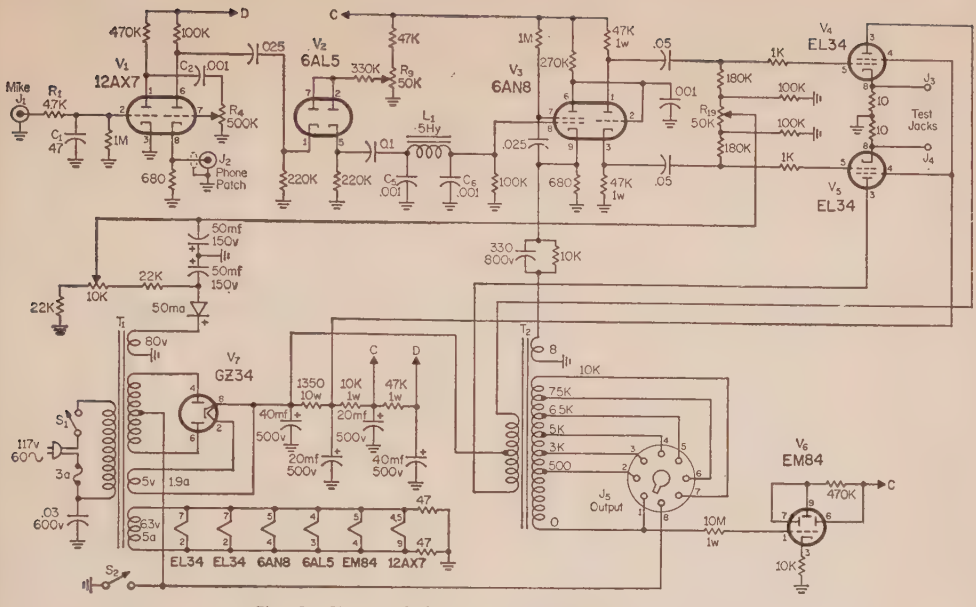


Fig. 1—Circuit of the EICO 730 Modulator-Driver Kit.

stage. Control R_{19} permits the tubes to be electrically balanced by controlling the amount of fixed bias provided by a separate bias supply. The special multi-match modulation transformer features an additional secondary winding which provides the required feedback voltage to the previous stage.

The full wave, capacitor input power supply utilizes a GZ34/5AR4 rectifier tube. The application of high voltage to the modulator may be controlled either by the PLATE supply switch, S_2, or through the output octal socket on the rear apron by means of a remote set of contacts (perhaps on the antenna change-over relay). A separate selenium bias supply makes available approximately 70 volts of bias for the operation of the output tubes.

The over-modulation indicator is an EM84 cathode-ray tube. When the 730 is used as a modulator this tube indicates when the peak value of the audio output from the modulator exceeds the voltage applied to the r.f. amplifier. The peak value may be adjusted to any desired level by R_9, the CLIPPING LEVEL control. This potentiometer controls the plate voltage applied to the 6AL5 diode clipper and therefore controls the signal clipping level.

Construction

The 730 is particularly easy to construct and adjust for optimum performance. Well written instructions and six pictorials pave the way for you. It is necessary that you know the plate impedance of the tube or tubes in the rig you wish to modulate so that the correct connection may be made to the modulator output. In the case of a 6146, the 5000 ohm termination at pin 4 of the modulator accessory socket will do nicely.

When you desire to operate c.w. there is one precaution to observe with the 730. The secondary of the modulation transformer should be shorted by means of a s.p.s.t. switch which may be added to the front panel or, alternatively, the power supplied to the r.f. amplifier should be routed some way other than through the secondary. The latter may be accomplished at many transmitters by inserting the octal shorting plug, thereby jumping the plate supply terminals. If this precaution is not observed, the secondary of the modulation transformer attempts to function as a filter choke and it is not capable of handling the inductive requirements of c.w. operation. Several instances of damaged transformers due to this problem have been brought to our attention. This problem has been called to the attention of the manufacturer and it has been suggested that he include this information in the next revision of his instruction manual which accompanies the 730 kit, and that an addendum sheet be provided with the present manual.

On-air reports with the 730 have all been in praise of the excellent audio quality of this modulator. Approximately ten hours of construction time is required to complete the 730 and have it ready for 'phone operation. ■

". . . now I'm on the dynamic mike . . ."

Lawful and Ethical Procedures Applying to Radiotelephone Operation

BY CARL DRUMELLER*, W5EHC

How correct is your operating procedure? Here are 20 typical situations frequently encountered on the bands. See how your procedure rates.

1. W5PAA wishes to call W5UYQ. The legal procedure is:
   A. W5UYQ, this is W5PAA. Over.
   B. W5PAA calling W5UYQ. Over.
2. W5PAA has been in contact with W5UYQ and desires to turn it back to W5UYQ but does not wish to terminate the contact. The legal procedure is:
   A. W5PAA standing by for W5UYQ. Come in.
   B. W5PAA standing by for W5UYQ. Over.
   C. W5UYQ, this is W5PAA. Over.
   D. W5UYQ, this is W5PAA. Break.
3. W5PAA is in contact with W5IYU, who is operating portable for a period of three weeks at Wheatland, Oklahoma. When calling him, the lawful procedure is:
   A. W5IYU portable 5 from W5PAA. . . .
   B. W5IYU operating portable at Wheatland, Oklahoma, this is W5PAA. . . .
   C. W5IYU, this is W5PAA. . . .
   D. W5PAA calling W5IYU portable W5 at Wheatland, Oklahoma. . . .
   E. W5PAA coming back to W5IYU portable 5 at Wheatland, Oklahoma. . . .
4. W5PAA has heard W5UYQ calling a "General Inquiry" call. W5UYQ is operating mobile in an automobile in Oklahoma City, Oklahoma. The legal procedure for W5PAA to answer the call is:
   A. W5UYQ, this is W5PAA. . . .
   B. W5LYQ mobile 5, this is W5PAA. . . .
   C. W5UYQ mobile in Oklahoma, City, Oklahoma, this is W5PAA. . . .
   D. W5PAA calling W5UYQ mobile 5 in Oklahoma City, Oklahoma. . . .
   E. W5PAA calling W5UYQ mobile. . . .
5. K5LDF is operating mobile in an automobile in Oklahoma City, Oklahoma. He hears W5PAA calling a "General Inquiry" call and desires to answer him. The lawful procedure is:
   A. W5PAA, this is K5LDF mobile 5. . . .
   B. W5PAA, this is K5LDF mobile in motion. . . .
   C. W5PAA, this is K5LDF mobile in Oklahoma City, Oklahoma. . . .
   D. W5PAA, this is K5LDF, Oklahoma City, Oklahoma. . . .
   E. K5LDF mobile 5 calling W5PAA. . . .
6. A round-table contact is in progress, including W5PAA, W5IYU, W5UYQ, K5LDF, and W5JSP. W5UYQ has been acting as "Net control" with each station turning it back to him before it is passed on to the next station in rotation. To comply with FCC requirements, W5JSP should log contact with:
   A. W5PAA, W5IYU, W5UYQ, and K5DLF.
   B. W5UYQ only.
   C. The station (other than "net control") who was transmitting before W5JSP transmitted and the station (other than "net control") who transmitted after W5JSP.
7. The same round-table is in operation but with no "net control", each turning it over to the next station in rotation as listed in Question 6. To comply with FCC requirements, W5IYU should log contact with:
   A. W5PAA, W5UYQ, K5LDF, and W5JSP.
   B. W5PAA only.
   C. W5PAA and W5UYQ.
   D. W5UYQ only.
8. W5UYQ and K5LDF are in conversation but not using voice-operated relay control. K5LDF has finished a transmission (but not the conversation) and wants a quick answer from W5UYQ on a question just asked. The legal procedure is:
   A. W5UYQ, K5LDF. Break, Break.
   B. W5UYQ, this is K5LDF. Break, Break.
   C. Break, Break.
   D. W5UYQ, this is K5LDF. Over.
   E. This is K5LDF. Go ahead, W5UYQ.
9. W5PAA has finished a pleasant chat with W5KHJ and wishes to terminate the contact. The operator at W5PAA intends to listen to W5KHJ's reply but has no intention of making any further transmission to him. The lawful procedure is:
   A. W5KHJ, this is W5PAA, over, off, and listening for your final.

*Aeronautical Center Amateur Radio Club, 5824 N. W. 58th Street, Oklahoma City, Oklahoma

B. W5KHJ, this is W5PAA. Over and out.
C. W5KHJ, this is W5PAA. Out.
D. W5PAA is signing with W5KHJ and listening for your final.
E. W5PAA is clear with W5KHJ.

10. W1AW hears W5PAA on the 14.2 mc band. The operator is saying: "*We* have a KWS-1 transmitter and a 75A-4 receiver. *We* are using a three-element beam antenna. *Our* radio-frequency analyzer indicated your modulation as about 85%." From this the operator at W1AW concludes that the operator at W5PAA is: (Mark all reasonable choices.)
A. Pregnant and "speaking for two."
B. A megalomanic who imagines himself an emperor and uses the imperial "*We*."
C. An operator at a multi-operator station such as a club station.
D. A 24-carat "lid".

11. W5IYU, operating portable at Wheatland, Oklahoma, desires to call W5PAA. The lawful procedure is:
A. W5PAA, this W5IYU portable at Wheatland, Oklahoma.
B. W5PAA, this is W5IYU portable 5.
C. W5PAA, this is W5IYU slant 5.
D. W5IYU slant 5 calling W5PAA.

12. W5TMY has been listening to a group of stations working break-in. They do not observe any particular rotation of transmission so he cannot ascertain which station will transmit next. He wishes to join the group. The ethical procedure is:
A. Break.
B. Break. This is W5TMY.
C. Break, Break, Break.
D. This is W5TMY. May I join?

13. W5TMY is in contact with W5EHC. Each station is limiting its transmission to less than a two minute duration. W5TMY wishes to turn it over to W5EHC. To comply with FCC Regulations, the procedure is:
A. Over.
B. W5EHC from W5TMY.
C. W5TMY standing by for W5EHC.
D. W5EHC, W5TMY.

14. W5TMY is in contact with W5PAA. Each transmission has been less than two minutes in duration. At the end of ten minutes of conversation each wishes to identify. W5TMY should say (to comply with FCC Regulations):
A. For identification, this is W5TMY.
B. For identification purposes. W5PAA, this is W5TMY.
C. This is W5TMY.

15. W5KBY is operating mobile in an airplane flying over Ardmore, Oklahoma. He is in contact with W5PAA. When he calls W5PAA, he should say:
A. W5PAA, this is W5KBY aeronautical mobile.
B. W5PAA, this is W5KBY mobile over Ardmore, Oklahoma.
C. W5PAA, this is W5KBY mobile 5.
D. W5KBY aeronautical mobile over Ardmore, Oklahoma, calling W5PAA.

16. W5PAA is calling W5JKK, who is having difficulty copying through heavy interference. W5PAA is using phonetics in order to be understood. The ethical procedure is.
A. . . . this is W5PAA: Whiskey Five Papa Alpha Alpha.
B. . . . this is Whiskey Five Papa Alpha Alpha.

17. W5PAA has a message filed on 5 July of this year for delivery to Mrs. John Q. Jones, 1414 West Cedar Street, Jonesville, Okla. The operator at W5PAA is in contact with a station in Jonesville. The correct procedure for transmitting the preamble of the message is:
A. Here is message number 20 W5PAA check not given Oklahoma City, Oklahoma 2000 hours 5 July to Mrs. John Q. Jones one four one four I say again one four one four West Cedar Street Jonesville Oklahoma.
B. Copy a message number 20 repeat number 20 from this station W5PAA Whiskey Five Papa Alpha Alpha check double X-ray Oklahoma City Oklahoma filing time 2000 hours this date 5 July 1961 going to a married lady Mrs John common spelling Juliett Oscar Hotel November initial Q as in Quebec Jones common spelling Juliett Oscar November Echo Sierra fourteen fourteen direction West Cedar Street repeat direction West Cedar Street Jonesville I spell Juliett Oscar November Echo Sierra Victor India Lima Lima Echo Oklahoma.

18. WV5ZZZ had a renegade amateur commit perjury in order to get a Novice Class license. He lives in Oklahoma City but also owns a ranch near Elk City, Oklahoma. Having grown tired of using his Johnson Kilowatt on the Novice bands, he decides to get a Conditional Class license. While spending a week-end at his Elk City ranch he writes the FCC for Conditional Class application forms. Two weeks later, while at the ranch again, the perjuring renegade fills out the license examination for him. When the Conditional Class license arrives, he sends in a modification for operation at Oklahoma City.
A. The FCC will not honor the application but will require him to take an examination for General Class.
B. The FCC will honor the application but will require him to take the examination for General Class the next time the examiner is in Oklahoma City on a regularly-scheduled examination.
C. The FCC will honor the application and permit him to operate just as if he had passed a real examination.

[*Continued on page 109*]

A Simple Transmitter Control Panel

BY PAUL AMIS*, W7RGL

The author, dismayed by the complexity and lack of flexibility of the usual control panel, designed one to fit his needs. The result is a simple and extremely flexible unit that can be tailored to most installations.

THERE is certainly nothing complicated about the lowly (or garden variety) transmitter control panel, and yet this one item seems to create undue awe amongst the ranks of budding newcomers. Leave us face it, in our unquenchable thirst for gadgetry and the belief that we should get our signal into the air (after the guy on the other end of the ether has turned it over) before the sun cools, we lean towards a one-switch operation. There seems to lie the nut of the whole business. Many amateurs have yet to figure out a way to switch all the station "gak" and still have one-switch control. Know something? I was among those worthies for a long time. Somehow all the panel circuits looked like the master switching diagrams of the Grand Coulee Dam.

One day, to my surprise, I found myself doodling a control circuit which even I could understand. Furthermore, it was reasonably flexible and easily transportable. Don't sneer at this last item. I mind a unit I whipped together that was used for Field Day one year. By Sunday afternoon I hated that piece of misbegotten equipment with a purple passion; It would not stand upright and I had neglected to provide any framework to hold it erect; It bit me everytime I got anywhere close to it. It buzzed and hummed and drew massive sparks to the extent that I was sure, on several occasions, while looking across our operating table towards the 80-meter position, I could see the operator's backbone through his vest.

After my metabolism had recovered from this particular 24-hour stint, I took pencil firmly in hand and scratched out this panel which, over the years, has proved extremely versatile, simple, and fool-proof. I made a list of the requirements which I thought was needed and designed the unit around them:

1. It must turn on an exciter.
2. It must apply voltage to a high power final.
3. It must turn on a v.f.o.
4. It must mute the receiver.
5. It must feed receiver audio to headphones while receiving, and the monitor (sidetone) signal while transmitting.
6. It must have provisions for two headsets (one for an assistant logger, or the like).
7. It must supply switched 115 v.a.c. for an antenna relay if used remote from the big rig.
8. It must have provisions for zeroing the v.f.o. without disabling the receiver or turning on the final.
9. It should have provisions for monitoring the a.c. line voltage.
10. It must have provisions for using a foot-switch to control the station for high-speed contest work.
11. It must be separate and adaptable for a variety of rig setups.
12. It must have provisions for fastening to a temporary surface in portable or emergency operation, and
13. It must be reasonably inexpensive to build.

With a minimum of parts, this control panel does exactly that.

At this point, we will give the interested reader exactly three minutes to peruse fig. 1 whilst we investigate the coffee pot.

Undoubtedly by now, many of the readers will be somewhat aghast over some of the parts displayed in fig. 1. They shouldn't be. Those of you who have avoided the surplus electronics dumps have been missing a good bet. For a pittance one can obtain 115 v.a.c. relays, terminal boards, phone jacks, and suitable switches for the removal. Also, right-angle brackets, miscellaneous angle stock, and other hardware may be had for so much a pound. Even if your QTH is located in the middle of the Steppes, or on top of some inaccessible mountain and surplus stores are few and far between, the catalogs of several radio parts stores have regular specials on quality surplus items which places their use within the realm of every poverty-stricken builder.

Circuit And Parts

The XMIT-REC switch in this control panel was removed from a TAJ Navy transmitter where it originally functioned as a TEST-KEY-LOCKED KEY switch. It is spring loaded in the UP position, and locks in the DOWN position,

*Rt. 1, Box 438, Poulsbo, Washington.

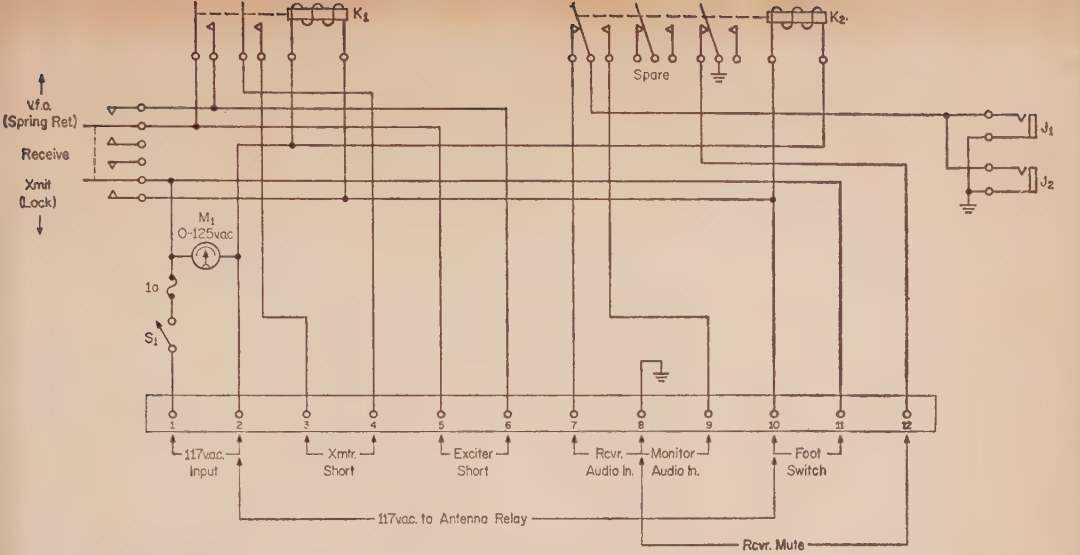


Fig 1—Schematic of a simple transmitter control panel that may be used for portable or fixed operation. The 117 a.c. relays and all other components are surplus items.

thus making it ideal for this type of control panel. If your surplus sources are fresh out of the above, imported telephone type lever action switches are available from some of the catalog parts houses (Burstein Appleby, catalog #17C682) for 99¢ each which will do nicely.

In an effort to make this panel as flexible and informative as possible, fig. 1 shows a 125 v.a.c. meter and a line switch included in the schematic. These particular items have not been built into my unit since power is controlled by a master station switch. As for the meter, station line meters tend to frustrate me as any discrepancies in line voltage usually fall into the category of "things-I-can-do-little-about." For portable operation, such as Field Day and the like, I have a power distribution panel which is already metered. But because some of you will happen to be one of the braver sort, a meter has been shown in the schematic.

At my station the c.w. monitor is a separate unit and the monitor audio is fed into the control panel for inclusion in the headphone switching circuit. A "phone only" operator would not need this feature. Also, my receiver (a SX-101) is muted by switching in a biasing resistor to the receiver front end while in STANDBY and shorting it out either by the RECEIVE-STANDBY switch on the receiver front panel or by the relay contacts in the control panel. Other receivers may use different methods for receiver muting, and this might necessitate a different switching arrangement.

It will be noted that, in both cases, I refer to the transmitter controlling relay contacts as XMTR SHORT and EXCITER SHORT respectively, since my exciter is controlled by shorting the center-tap of the h.v. winding of the power transformer to ground, and my high-power final is energized by closing the primary power circuit to the transformer.

In the v.f.o. (spring-loaded UP) position of the control panel lever action switch, power is applied to the v.f.o. only (assuming key up on the exciter) thereby allowing me to zero a station without arousing the combined ire of other inhabitants of the bands. Most commercial v.f.o.'s and those which have been home-brewed will leak enough signal to allow easy v.f.o. tracking in the receiver. To those of you who have a v.f.o. whose tightness is such that no signal can leak out, I can only offer my congratulations on your technical acumen, and why aren't you using break-in, thus negating the need for such a control panel as this article describes?

The provision for switched 115 v.a.c. for an antenna relay is used on portable expeditions when only the station exciter is used and the main station antenna coupler is left at home.

Construction

The actual form of your control box is strictly up to your individual station, junk box, and finances. You may want to enclose this unit in a box, or, like I did, build the control on a standard aluminum front panel, 5½" high, to fit under the shelf supporting my receiver. In any event, protect yourself from accidental contact with the relays and terminal boards since dangerous voltages exist across opened h.v. transformer center-tap terminals and across energized relay coils. Further, it is an excellent idea to provide some sort of dust-cover enclosure to insure that a minimum of dust will be accumulated on the pole pieces of the various relays. One small piece of metallic grit teetering on the coil pole due to residual magnetism can generate enough relay chatter to finish driving the average amateur completely out of his mind. And while we're speaking of relay hum, if you purchase surplus re-

[*Continued on page 100*]

A ZENER DIODE TRANSMITTER

BY DR. SHORZA GITCHAGOOME*

The editors of CQ are pleased to introduce a new technical breakthrough in the field of solid state transmitting equipment. The new concept developed by Dr. Gitchagoome has not been described in any other journal.

THE technique of employing zener diodes for voltage stabilization is well known throughout the communications industry. Less well known, however, is the fact that their characteristics lend themselves quite well to high-power radio frequency generation.

To see why this is so, one must first understand the action of the zener diode in static circuits. Once this operation is clear, the expansion to a dynamic condition will be much easier to comprehend.

Basically the zener diode is a reverse biased junction which is capable of "breaking down" at discreet voltage levels. The operation may be easier to comprehend if the diode is thought of as the solid state equivalent of the gas regulator tube.

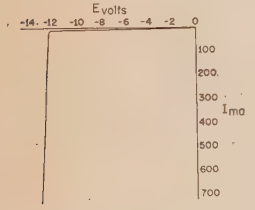


Fig. 1—Typical breakdown characteristics of the 1N1605 zener diode.

The drawing in fig. 1 represents a typical voltage-current characteristic curve for a 12 volt zener diode. The curve is not idealized, but is fairly representative of what can be produced with modern day processing techniques. Note that at potentials between zero and 11.5 volts, so little current flows through the junction as to be insignificant. However, when the terminal potential is increased beyond this point, the carriers in the silicon wafer avalanche, thereby permitting a heavy current to flow through the junction. The regulator application finds the zener diode fed through a series current limiting resistance from a voltage source somewhat higher than the breakdown potential of the diode junction. The terminal potential of the diode would then be stabilized at this breakdown potential. Zener diodes are available in RETMA ratings from about 3.9 to several hundred volts.

An R. F. Transmitter

A 12 volt zener diode was used for these experiments since it is compatible with modern automotive electrical systems and permitted the use of a commercial storage battery for a convenient voltage source. By examining the circuit shown in fig. 2, the reader can see that a source of low-voltage r.f. can be used to dynamically swing the diode terminal potential through the breakdown region. For example, when the applied r.f. is positive with respect to

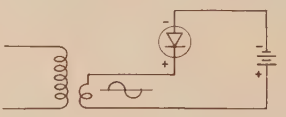


Fig. 2—Simplified method of exciting the diode.

common, or ground, it opposes the terminal potential of the zener diode, thereby shifting the operating point well *back* from the breakdown region. However, on the negative half-cycle, the d.c. and a.c. sources add and move the operating point *into* the breakdown region. When this occurs, large currents flow through the diode as before. Thus, the current flow through the battery consists of a series of half-wave pulses exactly the same as those found in a class-C r.f. power amplifier. Fig. 3 shows what occurs when the diode is driven by r.f. and the mechanism by which amplification occurs. By using a high Q tuned circuit in series with the battery the sine-shape of the original waveform can be reproduced due to ringing of the tuned circuit.

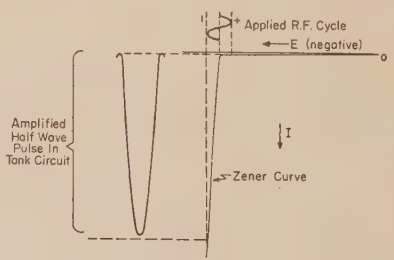


Fig. 3—Amplification method using diode slope characteristics.

A practical working circuit to accomplish this is shown in fig. 4. The r.f. source is quite conventional and was originally described in Donald Stoner's SEMICONDUCTOR column several months ago. A Texas Instruments type R-425 was used as the oscillator, but could be replaced with the more common 2N384. The circuit consists of a common emitter oscillator

*Ball Research Laboratories, Los Angeles, California.

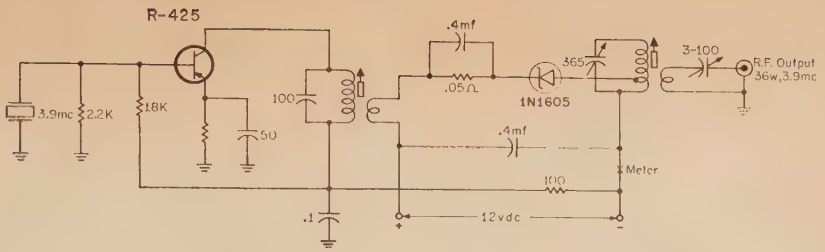


Fig. 4—Schematic diagram of the zener diode transmitter.

with the crystal in series with the r.f. feedback path. Link coupling is employed from the oscillator tank coil to match the very low input impedance of the zener diode.

For this same reason, the anode of the zener diode is connected about 5% of the total number of turns from the bottom of the coil. The tap point is empirically determined. If it is too high on the coil, the loaded *Q* of the tuned circuit will be drastically reduced and unwanted harmonics may be radiated. If too low on the coil, the transformed impedance at the top will be too high and excessive loss can occur. The transmitter is coupled to the antenna through a link winding and reactance matching capacitor which acts as a loading control.

Tuning the transmitter is quite similar to vacuum tube class-C stages. When the oscillator drive is disabled, the diode anode current drops to a few microamperes. When drive is applied, the current will rise as is characteristic of solid state circuitry. The exact amount of anode current will depend on the tuning of the tank coil, the antenna loading and, of course, the amount of drive.

The zener diode can be any good quality type with a sharp knee. The breakdown voltage should be selected to be compatible with the power supply potential. The diode dissipation rating will determine how much power input can be run.

The diode used in the prototype was an International Rectifier type 1N1605 (house number 10Z11T10). This diode is rated at 12 volts breakdown with 10 watts dissipation. The maximum static current is one ampere. However, due to the unusual mode of operation, it is permissible to draw a meter-indicated four amperes. This is because the diode draws current only over a portion of the r.f. cycle. It operates with a short duty cycle and long resting period. Note in the transmitter schematic (fig. 4), the 0.1 ohm cathode. This is included to produce a self bias (due to rectification) which runs the diode into the class-C region and results in a conduction angle of considerably less than 180°. Thus it can be seen that the diode operates on a short conduction duty cycle which permits the static current rating to be grossly exceeded.

The actual power input which can be run is determined entirely by diode stud temperature. With 48 watts input (12 volts at 4 amperes) the diode temperature rises to approximately 85°C. Needless to say, a good heat sink of at least 100 square inches of surface area is required to adequately cool the device. The power output is approximately 36 watts into a 51 ohm load at 3.9 mc. The power output will decrease at a rate of approximately 6 db per octave above this frequency due to storage of carriers. This effect is common to all semiconductor devices and is one of the limiting factors in high frequency operation.

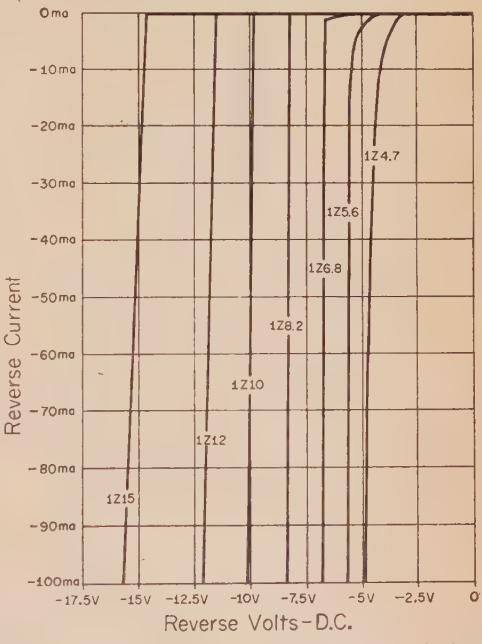


Fig. 5—Reverse current curves of typical zener diodes.

The amount of drive required will be determined entirely by the sharpness of the zener knee characteristic and the slope of the curve. Fig. 5 shows a series of curves for diodes with various breakdown voltages. Obviously the 7.5 volt diode requires the least amount of drive, and has a near vertical rise current slope. The 12 volt diode requires a drivel level of approximately 1.5 volts peak-to-peak in order to swing the diode into the 4 ampere region. This can easily be furnished by a transistor having a dissipation of 150 milliwatts.

Work on this transmitter has brought several new developments to light, among them similar devices using the silicon Controlled Rectifier, and four-layer diode. ■

Tips On Working Mobile Stations

BY CDR. GAY E. MILIUS, JR., U.S.N.R.*, W4NJF

"W1XYZ from W1ZZZ—Joe, I think a mobile is breaking. Want to stand by?—OK—The mobile—hang on, will you, OM, we will be with you right away! OK Joe, as you were saying, etc., etc., etc." Passage of time—passage of distance—complete passage of QSO. "OK, mobile, come on in." (Silence.) "Wonder where that guy went to? He had a real fine business signal."

Fictionalized? Yes, but representative, yes! Many amateurs appear to be completely unfamiliar with the problems of mobile operation and do not understand how to communicate with them properly from a fixed station. This was revealed to me on a summer motor trip during which I did considerable operating.

The majority of home station operators enjoy contacting mobiles but fail in handling the QSO after it has begun. The gravest error committed is to make transmissions lengthy. Today we are in the age of turnpikes and throughways. On those thoroughfares cars never travel less than 55 to 60 miles per hour. Elementary arithmetic will show that a mobile station will have travelled quite a distance during a transmission of two to five minutes. And yet this is what continually happened to me. For example, at one time I actually went from one state into another and back again, almost fifteen miles, before the exuberant fixed station gave me an opportunity to speak. Needless to say, I am sure he wondered why I did not come back to him when he turned it over; I had reached the fringe of his signal and could hardly hear him. He did pop up a few miles farther on but it was too late. Another time I had to pull off the road to hear the remainder of the other fellow's transmission because I knew I was about to reach an area where signals were attenuated and I was extremely interested in what he had to say. However, the other chap would not stop talking long enough to let me tell him what to expect. It is rude to merely end a QSO without warning but on several occasions it was necessary to do just that because no opportunity was afforded me to inform the fixed station that I had reached my destination.

The next item against which to guard is the broad subject matter or akin to that a vast number of questions asked. When each transmission contains numerous questions requiring replies, to remember them it becomes necessary to write them down. This is almost impossible. It is difficult enough to keep a mobile log.

*421 Saddle Rock Road, Norfolk 2, Virginia

Mobiles contact fixed stations, of course, because they afford the most stable contact and because the fixed stations are in the majority on the air. Consequently, I found that it was better to attempt to break into an already constituted QSO for ragchew or into a net if I had traffic to pass. In this respect, the low power of the mobile, as well as its other disadvantages, must always be considered against the high power of the fixed stations. The possibilities of obtaining a reply to a CQ is fairly remote although during my trip I had some fine results. This is especially so on weekdays when most of the ham population is trying to earn money enough to buy new equipment. It is always better, as when working DX, to listen for another station calling CQ and zero beat him. This leads into a dissertation on an obnoxious practice to which I was submitted several times.

I broke into a ragchew which I was receiving quite well. My break-in was acknowledged, but I was informed to stand-by until the next go-around when I would be picked up. Needless to say, they completely forgot that I had called and never came back to me until I had repeated my break-in several times. Now, no harm was done by this; but if I had had an emergency it would not have been a good situation. By the time I was recognized I could have been many miles out of the skip or ground wave area at the rate I was travelling on the turnpike. Once I called a chap just as he had signed with another station. He came back to me as "the mobile", told me to "hold on a second" while he saw "who else was calling, because he never turned down a mobile". Before he had completed getting his other friends into the QSO I was so far in the opposite direction that I just logged him as a station called. The moral to this, if there is one, is when acknowledging a mobile station who has called, try not to keep him waiting very long. He may become mixed up in city traffic or may be miles out of range when you turn it to him.

The next problem which appeared is the same with which many of us are faced whether mobiling or operating at home. Repetition! I would be told that I was coming in "like a ton of bricks" and my report to the other fellow was the same. Immediately my fixed station friend repeated everything he had to say twice or three times. This is quite annoying when I was attempting to get directions to extricate myself from a city or town. By the time the

[*Continued on page 119*]

DX DX DX DX DX DX DX DX

URBAN LE JEUNE, JR., W2DEC
BOX 35, HAZLET, NEW JERSEY

The following certificates have been issued between the period from January 5th, 1962 to and including February 4th, 1962:

CW-PHONE WAZ

1636	OH6AA	Amateur Radio Club Vaasan Kuutoset
1637	SP6AAT	Jan Osowski
1638	OH3TY	Pentti Lareva
1639	W4BQY	G. B. Fisher
1640	W4EEE	George F. Norton
1641	KØIKL	Joyce L. Polley
1642	SP4JF	Tadeusz Nietupski
1643	VE4OX	D. E. McVittie

ALL-PHONE WAZ

120	DL6EN	Gunter Heinzen
121	W1BAN	C. T. Parham
122	I1RIF	Bruno Riffeser
123	W6GT	Bob Kennedy
124	W7ZAS	Larry Sweeney
125	PZ1AX	H. W. Green
126	VE6TF	A. L. Tuckey

SSB WAZ

52	W2ZX	Dale Kentner
53	W4QCW	J. Robert Eshleman
54	DL3DW	Rudy Riedel
55	W5PQA	H. W. Merideth, M.D.
56	W6GT	Bob Kennedy
57	W7ZAS	Larry Sweeney
58	PZ1AX	H. L. Green

CW WPX

261	W4BFR	Bruce E. Montgomery
262	W2FLD	Stanley Fredrickson
263	W8GMK	John Marhefka
264	VU2MD	Lt. Col. Dady S. Major
265	K8KTZ	George Boley
266	IT1TAI	Dr. Domenico Marino
267	W3PGB	Lee Roy Scott
268	W4BYU	Ed H. Mau
269	PAØLOU	Louis Van De Nadort
270	SM5AJR	Gunnar Johansson
271	LU5ABL	Miguel Lejneff
272	SM7BHF	Sigurd W. Gunnarsson
273	KH6DKA	William S. Haddon
274	WØVFE	Carl R. Ditsch
275	W4PLL	Doyle D. Thompson
276	W6ID	Vaughn I. Parry

PHONE WPX

49	W1UOP	Roger C. Paulson
50	VE2AFC	Alex Desmeules
51	G2AFQ	C. R. Goodall
52	W1ORV	Leonard C. Pray
53	VE6TF	A. L. Tuckey
54	G3BID	Edgar M. Wagner
55	CX2CN	Samuel C. Barreiro

SSB WPX

89	W1ORV	Leonard C. Pray
90	UA3FG	George V. Zhomov
91	W9EXY	Donald A. Jensen

MIXED WPX

7	HB9EU	Rudy Faesner
8	K4RID	W. R. Tippett, Jr.
9	SM5AJR	Gunnar Johansson
10	K2ZKU	Edward Gaudet
11	PAØLOU	Louis Van De Nadort
12	W9DWQ	Edward A. Goodbout
13	K9EAB	Cliff Corne

WPX ENDORSEMENTS

	Mode	Continent	Band
W2DGW	C.W.	E	80, 20,
W2KIR	C.W.	E	
K2KKU	C.W.	E	
K2ZRO	C.W.	E	
W4BYU	C.W.	E	20
W6NWI	C.W.		20
W8JIN	C.W.	A,O,F	40, 15, 10
W8RQ	C.W.	E	20
W8WT	Phone	E,N	10
G8PL	C.W.		20
IT1TAI	C.W.	E	20
MP4BBW	Phone	E	20
	S.S.B.		20
OK3EA	C.W.	E	
SM5AJR	Mixed	E	
SM5AJV	C.W.	E	

A-Asia; *E*-Europe; *F*-Africa; *N*-North America; *O*-Oceania; *S*-South America.

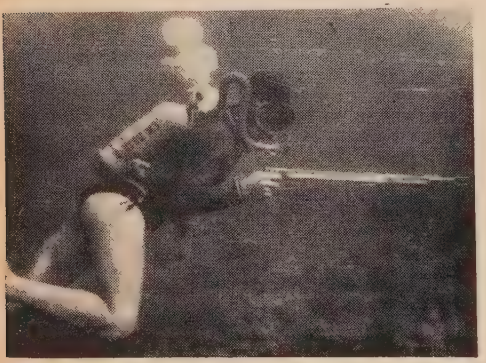
WPX HONOR ROLL

CW WPX

W2HMJ	651	W2MUM	500	K5LIA	428	PY4OD	402	SM3EP	361
W8KPL	553	K2CPR	490	G2GM	428	W5LGG	401	W5ERY	358
W2EQS	545	SM5CCE	488	OK1MB	428	W9GFF	401	W8JIN	356
W9YSX	544	W8PQQ	481	W3CGS	426	IT1TAI	401	W9UZC	356
W5KC	541	W4HYW	478	W1EIO	425	W9SFR	400	DL3TJ	354
K6CQM	538	K6SXA	464	WØPGI	420	VK3KB	400	PY2CK	354
W4OPM	531	K2ZKU	461	W5AWT	412			5A5TO	353
W6KG	528	W3BCY	457	W5DA	412	**PHONE WPX**		LA5HE	351
W2HO	526	W4BYU	456	W2PTD	411	W8WT	540		
W1IJB	513	K9AGB	454	K5LZO	411	W9WHM	510	**SSB WPX**	
W6WO	511	W9UXO	453	W4DKP	410	G3DO	487	MP4BBW	392
W2GT	510	K9EAB	451	K4JVE	407	CT1PK	479	W4OPM	372
W8LY	506	PAØLOU	451	W5AFX	407	W9YSQ	471	TI2HP	356
G3EYN	503	W3PGB	450	W2KIR	405	MP4BBW	431	K9EAB	350
W2NUT	502	W8JIN	450	W3OCU	405	VK6RU	421	W8PQQ	315
K2UKQ	500	W2MUM	450	DL3RK	403	TG9AD	381	HB9TL	315
W1EQ	500	W8RQ	445	JA2JW	403	W1UOP	368	W3MAC	307
		W3BQA	437	VE6VK	403	PAØHBO	363	K2MGE	263

W2VCZ	261		
W2YBO	257		
W3VSU	256		
UR2AR	255		
W1ORV	250		
G3NUG	250		
MIXED WPX			
HB9EU	551		
W2GT	528		
K2ZKU	482		
WØMCX	476		
W3CGS	475		
W9DWQ	465		
PAØLOU	452		
W1EIO	432		
K4RID	410		
W9KA	405		
SM5AJR	400		

In case you haven't noticed, this is none other than Floyd McCoy, VR6AC, who has been making Pitcairn Island QSO's available on s.s.b. lately. Floyd and Tom, VR6TC, comprise the entire ham population of that rare Island. *(Tnx K9BPO).*



Many of us have wondered what to do when the bands go dead as they have been doing quite a bit lately. Leo, the chief operator of UB5KAB, has come up with one answer. It looks like Leo is looking for DX crabs. Leo has piloted UB5KAB to 270 countries, the first station in the USSR to qualify for WAZ and WAE, and s.s.b. WAZ #3. *(Tnx W1CV).*

They start them young in DL4-land. Dave is the junior-op of DL4VE. The BC-342 shown was recently replaced with a Super-Pro. The 15 watt transmitter and dipole has accounted for 23 countries in the first five months of operation. *(Tnx DL4VE).*

The Origin of the Word "Ham"

The following tidbit is from the *RSGB* and should enable you to defend hams when we are referred to as "half of a pigs posterior."

"At last the true origin of the word 'Ham' is known. According to a script sent by K9QIZ to G3ILS one of the 1st amateur stations in the USA was that of the Harvard Wireless Club. The operators bore the names of Hyman, Almy, and Murray, and the identification letters used were HYALMU. This apparently caused some confusion and the first letter of each name only was used, thus forming the word HAM. This was recorded for posterity when Hyman appeared before a committee dealing with the 'Wireless Regulation Bill' in 1911, and frequent references were made to the station HAM, which was also mentioned in Congress.

W4LCY sent in the following gem, conceived no doubt, while tuning a dead band looking for a Zone 23 QSO.

WAZ Lament

Hark! ye bleary-eyed DXer,
Upon me look with glee,
No sense of logic too have I,
Because of WAZ.

Some people dote on Cadillacs,
Fat bank accounts and much,
I for one would trade my rig,
For a JT1 or such.

It's been many a weary hour,
Many an anxious day,
Since starting to roam the DX bands,
For fun instead of pay.

Now they say that sun-spot cycles,
And conditions will get worse,
Before I'll get Zone 23,
I'll gnash my teeth and curse.

But one of these happy days I know,
I really can't say when,
I'll send in forty QSL's,
And know it's for the end.

No more will I be concerned about,
Beam antennae and the like,
DX-peditions, QSL's,
Or if the skip is right.

When they lay me down to rest,
And peace is really mine,
I pray I'll have all 40 Zones,
Not the present 39.

So, QRX St. Peter,
Beckon not my weary bones,
I cannot QRT just yet,
I have not all 40 Zones.

Here and There

AC3/AC5 Sikkim/Bhutan: The DXpedition of AC3NRM and AC5NRM is set for March. Permission has been obtained for AC5 but as of now, permission is still lacking for AC3 op-

eration. If all goes as planned, they will leave about the end of March.

FO8 Marquesas: The following from KV4AA via the WGDXC. "I received a copy of a letter from W1WPO (ARRL) to W8EWS dealing with Marquesas DXCC status. He says no change will be made because these island groups are recognized as ONE overseas territory by France." Scratch one!

FW8 Wallis Island: The reason for the cancellation of the FW8 trip is that the French decided to use the Island for a radiation monitoring point. Another try is scheduled for April.

EP Iran: George, EP2AG, is on the lookout for Idaho, Utah, North and South Dakota, Vermont and Wyoming to complete his WAS. A call from any of these states would be appreciated by most of the EP gang.

ET2 Ethiopia: We're glad to hear that ET2US is back on the air. K1KOM, the Secretary of ET2US, reports that they have over 20 licensed operators but that individual call signs will not be issued. Due to the volume of business, we will QSL only cards received (use GMT pse). S.a.s.e. from USA (US postage) IRC from DX, will bring immediate reply. All others will be sent to DX Bureaus on the first of each month and to the US call areas on the 10th. Stations desiring local (Ethiopian) postage 4 IRC pse. (See QTH in the usual place).

JY Jordan: MP4QAO has applied for a license to operate for a short period from Jordan but he has met with difficulties because of JY2-NZK's previous activity in that country. Brian reports that the conditions of JY2NZK's license seem to have been overstepped considerably. W1TYQ, one of the 9K3TL/NZ operators, reports the same. (*Tnx* PAØ DXpress and Fla. DX Report)

TL8 Central African Republic: TL8AC will be silent for a while. Pierre is taking a well-earned vacation in France. When he returns to C.A.R. in October he will have a beam and more power, notes his QSL Manager W8KML.

TT8 Chad Republic: TT8AG is active every day on 14 mc from 1630 to 1800 GMT. He also operates 21 mc phone. (*Tnx W3KVQ*)

TU2 Ivory Coast: I'm sorry to report that Lloyd, TU2AL, ex-FF4AL, has been evacuated to a U.S. Army hospital in Frankfort, Germany. He was hospitalized on December 13 with a massive hemorrhage of the stomach. Let's hope that Lloyd's snappy fist and fine operating will be handing out those elusive TU2 QSO's soon.

VP4 Trinidad: VP4NC, Larry, was kind enough to send along the following news items from South Trinidad . . . South Trinidad now has its first tri-bander, erected recently by VP4NC with noble assistance from VP4LP and VP4LQ. Located at Naparima College, a Canadian missionary institution, the beam is ideally situated on a high hill overlooking the sea. The Club welcomed back "Doc" VP4PL recently returned from G-land and already an active DXer.

Plans for the future include an exhibition and demonstration of amateur radio at the local technical school. The public meeting will attempt to explain (or justify) the growing interest in ham radio in Trinidad.

VQ8/B St. Brandon: VQ8APB made only 27 QSO's during his recent stay. W3CRA, K2UYG, and W4OPM are the only W's known to have made the grade.

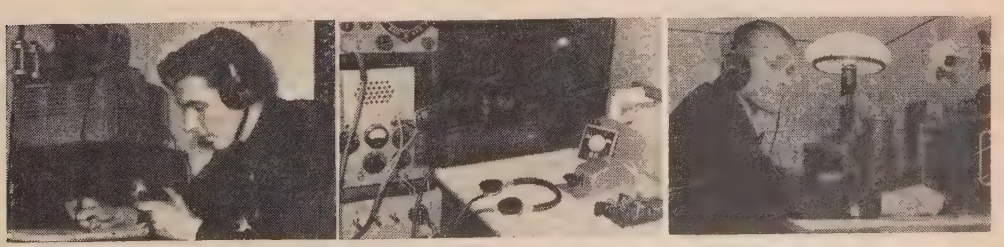
VQ8/R Rodriguez Island: VQ8BC mentioned that he has a permanent invitation to visit Rodriguez. He hopes to be on from there in May. Call will most likely be VQ8BCR. 14 mc and 21 mc c.w. will be used. (*Tnx WGDXC*)

VS9/K Kamaran Island: All direct QSL's have now been sent by G3GJQ and the remainder via the Bureau will be sent by the end of January. After March 1, all requests for QSLs should be sent directly to the stations concerned as the logs are being returned from G3GJQ. See the QTHs in the usual spot. (*Tnx WGDXC es G2BVN*).

VR5 Tonga: Dave, ZL1AV, formerly of *Yasme*, is now one of the Radio Inspectors of New Zealand. Very soon he is scheduled to go to Tonga and will probably work c.w. on 7 and 14 mc. He says it's imminent and the rig is all ready to go. License is no problem, of course.

VU2 India: W8QNW, who is VU2SO's QSL Manager, reports that Goose is active daily on 14 and 21 mc c.w. VU2SO, who toils as an electrical engineer, uses 50 watts, a dipole and SX-28 inhaler.

XE4 Socorro Island: For those of you who missed the recent XF4 operation, Carlos, XE1-CV, says he thinks the Mexican Navy is going to give permission for a c.w. station to be installed on the island and operated by one of



Thanks to Ben, UC2AA, for these three pictures. They are from left to right Enn, UR2AR; Endel, UR2DZ not shown at the rig, and Alec, UR2AK. These three fellows and Karl, UR2BU, are probably the most popular of all the UR2 stations. They are all very active and they all QSL.

the men stationed there. (*Tnx Florida* DX Report)

XT2 Upper Volta: I hope this reaches you in time for it to be useful. Louis, 9G1DP, will operate as XT2Z again on March 24 and 25. This is the week end of the ARRL DX Phone contest. The operating frequencies will be 14342 kc and 21342 kc. Please, at all times, call him at least 10 kc down. If you call 10 up you are in real trouble. QSL via K4TWF. (*Tnx WGDXC*)

4W1 Yemen: Bryan, MP4QAO, is quoted by the PAØ *DXpress* as saying he has no knowledge of any legal ham activity in Yemen and is convinced that 4W1AA is as phony as a three dollar bill.

5U7 Niger: 5U7AC is leaving April 30th for a vacation in France. W9RKP, his QSL Manager, is shipping an HQ-129X and a beam which Yves will use on his return to 5U7 land. (*Tnx WGDXC*)

9K2 Kuwait: Frank, W3RYX, will be in Kuwait for the next year and will try and keep 9K2AM active on 20 meter s.s.b. between 1200 and 1400 GMT.

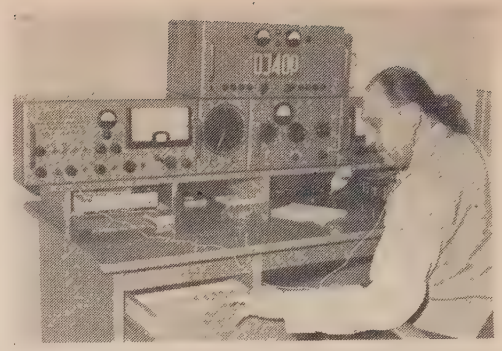
This neat station belongs to Lou, PAØLOU, who is co-editor of the VERON *DX-Press*. Lou, who is one of the best operators in Europe, may be found during any contest.

9K3/NZ Neutral Zone: Vic, W1TYQ, who was one of the 9K3TL/NZ operators last year is considering a possible encore. (*Tnx WGDXC*)

Zone 23: From VE7ZM via the WGDXC, we hear that JT1KDA is now on s.s.b. from Zone 23 with a low-powered exciter. He should be QRV with a final soon. UAØKYA has just about finished an s.s.b. rig and should also be QRV soon.

DXpeditions

W4BPD is making final arrangements for his extensive DXpedition, which should result in a few new countries being made available. He plans to leave for the Seychelles in late March. His first operation, according to present plans, will be from VQ7. Other islands in the Indian Ocean will be visited if transportation arrangements can be made. He is leaving no stone unturned to make all of the necessary transportation and passport arrangements.



This completely home brew station belongs to Werner, DJ4OP. Werner is a certificate hunter and is a member of the Certificate Hunters Club. (*Tnx K2UKQ*).

The following letter from Gus appeared in the WGDXC *Bulletin*. "I just got back from one solid week in Washington, D.C. For five entire days I went from one Consulate to the other getting those Visas in my Passport. The trip was very successful. I have a number of 'Special Letters of Introduction' to the Director of Telecommunications in a number of the countries. These will act as door openers when I get there, I hope. At this time it looks as if it will be to the Aldabras via the Seychelles and Bombay. Since all boats from Mombasa, Kenya are sold out for the entire year of 1962, that's getting to VQ7 via the Long Path."

If you don't know Gus and have never talked to him, you just can't realize what he can do. Believe me when I say that if there is any way humanly possible to operate from a remote country Gus will do it. I think he would swim there with a KWM-2 on his back if there was no other way. I'd like to wish him the best of luck on his trip. We'll all be looking for you, Gus.

W4CKB furnished the following information on the Bajo Nuevo DXpedition. "The date for departure has been fixed at April 25th. This is a Wednesday. We will leave Miami early the 25th, fly direct to San Andres and depart for Bajo Nuevo some time the same day. Herman, HK1QQ, will fly us, or at least make arrangements, for this trip. HKØAI will have the boat all set for the trip and it is very convenient to have a member of the DXpedition on hand at our point of departure. If all goes well, we should arrive at Bajo Nuevo late Friday so we should be all set for weekend operation. The date was set by the Captain of the vessel so that optimum weather and sea conditions can be expected.

Personnel: HK gang: HK1QQ, Herman; Edmundo, HK3LX; HKØAI, Victor; and HK3TZ, Crew of the vessel is unknown at this time. Herman mentioned taking along a couple of fellows to help out on the 'heavy labor.' As

Hong Kong Amateur Radio Transmitting Society 31st Anniversary Annual Dinner. Front Row: VS6EK (Hon. Secretary); VS6ET, VS6EP (holding trophy); VS6EM, VS6DS (President); Mr. Morrison (guest); VS6DK (Council Member). Second Row: Mr. Stokes (guest); VS6ET, XYL; VS6EG, XYL; VS6EP, XYL; Mrs. Talbot-Jones (guest); VS6EN, XYL; Mrs. Parry (guest); VS6DS, XYL. Third Row: XZ2AD, VS6EK, XYL VS6EL, XYL; CR9AI, XYL; Mrs. Stokes (guest); Mrs. Brooker; Miss Lee (guest); CR9AH, XYL. Fourth Row: S/Sgt. Brooker, VS6EL (Hon. Treasurer); CR9AI, CR9AH, VS6EN, VS6AE (Council Member); Mr. T. H. Lee, VS6EQ, VS6BE, VS1GC (guest). Back Row: VS6BH, Mr. Parry (guest); Mr. R. V. Talbot-Jones (guest of honor); VS6EG, XW8AS (guest); Mr. Carson (guest); S. P. N. DeSilva; M. Chan, Mr. Yuan (guest); A. F. Bailey, VS6DJ.

Herman often says, 'We travel like gentlemen.' W gang: Jake, W8FGX; Boots, W6HAW; Ed, W4QVJ; Dale, W4DQS and Bev, W4CKB are definite.

As you know, Danny Weil made the landing at Bajo Nuevo and had a total of only 2500 QSOs from there. Bajo Nuevo is 8 miles long by ¼ mile wide and there is no indication of anything there but the water line at high tide."

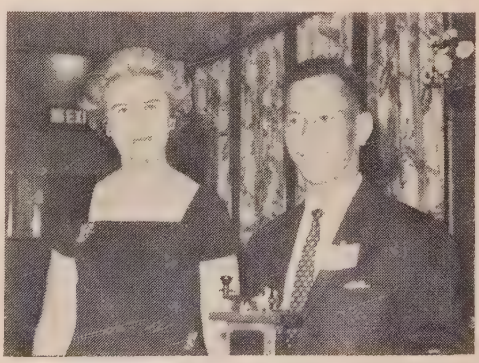
Late additions to the operators include W4-QVJ, W9EVI, WØNWX, HK1ABV and possibly TI2HP. The equipment will be HT-37s, HT-41s, SX-115s (2 complete c.w./s.s.b. kw rigs) Hy-Gain 20/40 duo-bander beams, Hy-Tower. Frequencies (as permitted by band conditions). *C.W.*, 3501, 7001, 14015, 21015; *S.S.B.*, 3975, 7295, 14348, 21448; *S.S.B./A.M.*, 7195, 14195, 21195. (They will listen for a.m. as announced by operators).

QSL via W4DQS 928 Trinidad, Cocoa Beach, Florida with s.a.s.e. (IRC). They will operate for *one day only* at Serrana Bank with a call in the KS4B block. Full call had not been assigned at press time. This will take place on May 3rd. Let's hope for good conditions on that day. *(Thanks to W4QVJ for last minute information.)*

73, Urb, W2DEC

QTH's and QSL Managers

FG7XN	P. O. Box 387, Pointe-a-Pitre, Guadeloupe, W.I.
FO8AN	via W8EWS



Paul, VS6EP, being presented with the President's Trophy at the Hong Kong Amateur Radio Transmitting Society's annual dinner. Making the presentation is Mrs. Talbot-Jones who is the XYL of R. V. Talbot-Jones, the Wireless Engineer of the General Post Office, Hong Kong. The Trophy is presented annually to the amateur who has done the most for amateur radio during the year.

ex-FQ8HO	W/VE via K6EC world wide for QSO's after 1 Oct. 1960 or via P. B. 8095 Aeroport, Dakar-Yott, Senegal
FY7AA	via K4KYB
FY7YE	via W5JLU
HR3JW	via K3COW
K4THQ/VE8	Harry F. Odil, Box 113, APO 432, N.Y., N.Y.
KM6CG	USN, MCB-11, c/o FPO, San Francisco, Calif.
SVØWQ	via W4YWX
TT8AA	P. B. 235, Ft. Lamy, Tchad Republic, W. Africa

[*Continued on page 98*]

PROPAGATION

George Jacobs, W3ASK
11307 Clara St., Silver Spring, Md.

LAST MINUTE FORECAST

The following is a forecast of day-to-day propagation conditions expected during April 1962. This forecast attempts to predict *specific* days upon which openings shown in the Propagation Charts in this column are most likely to occur, and the expected quality of the openings. For example, the following forecast shows that circuits rated (2) in the Charts are most likely to open with "good" quality (B) when conditions are above normal (April 5, 19-20 & 25-26), and with "fair to poor" quality (C-D) on days when conditions are expected to be normal. Circuits rated (2) are not expected to open on those days forecast to be "below normal" or "disturbed", etc.

PROPAGATION CONDITIONS and CIRCUIT QUALITY

Prop. Chart Forecast Rating	*Above Normal Days* Apr. 5, 19-20, 25-26	*Normal Days* Apr. 1-4, 6, 9-10, 13 16-18, 21-24, 27, 30	*Below Normal Days* Apr. 8, 14-15, 28-29	*Disturbed Days* Apr. 7, 11-12
(1)	C	D-E	E	E
(2)	B	C-D	E	E
(3)	A	B-C	D-E	E
(4)	A	A-B	C	D-E

Where:

A—An excellent opening with strong steady signals.
B—Good opening, moderately strong signals, with some fading and noise.
C—Fair opening, signals fluctuating between moderately strong and weak, with moderate fading and noise.
D—Poor opening, signals generally weak, with considerable fading and high noise level.
E—Very poor opening, or none at all.

DURING April, as a result of normal seasonal variations in the layers of the ionosphere, daytime maximum usable frequencies to most areas of the world are expected to be noticeably *lower* than they were during the winter months, while nighttime MUFs should be somewhat *higher*.

Ionospheric absorption continues to increase during April in the northern hemisphere as the sun rises higher in northern skies. Atmospheric noise (static) also increases as thunderstorms become more numerous.

The occurrence of Sporadic-*E* ionization begins to increase considerably during April, rising to a peak during the late spring and summer months.

This month's column contains DX Propagation Charts centered on the United States, to most major areas of the world, for April and May. Propagation Charts for short-skip openings expected during April for distances between 50 and 2300 miles, appeared in last month's column.

General Forecast

The following is an overall picture of *general* propagation conditons forecast for each h.f. amateur band during April. For *specific* times of band openings refer to the Propagation Charts on the next page, and for a forecast of day-to-day propagation conditions expected during the month, refer to the "Last Minute Forecast" appearing at the beginning of this column.

10 Meters: The combination of a seasonally weaker ionosphere and steadily declining solar activity, is expected to result in very few 10 meter openings. Except for some infrequent daytime openings to southern and tropical areas, very little DX is forecast for April. An increase in short-skip openings between distances of approximately 750 and 1400 miles is expected as a result of increased Sporadic-*E* ionization in the earth's atmosphere.

15 Meters: A noticeable decrease in 15 meter DX openings is forecast for April. While the band is expected to open to many areas of the world during the daylight and early evening hours, openings will be far less frequent than during the winter months, and signal levels somewhat weaker. Short-skip openings between distances of approximately 600 and 1300 miles are expected to increase during April as a result of Sporadic-E propagation, and fairly frequent *F*-layer short-skip openings are expected between distances of 1300 and 2300 miles during the afternoon and early evening hours.

20 Meters: During April, 20 meters is expected to be the best band for DX during the daylight and early evening hours. Opening shortly after sunrise, good DX conditions should prevail to one area of the world or another, through the early evening hours. To southern and tropical regions, the band is expected to remain open frequently during the hours of darkness as well. Numerous short-skip openings between distances of approximately 400 and 1200 miles are forecast as a result of Sporadic-*E* propagation, and *F*-layer short-skip openings between 750 and 2300 miles should be possible throughout most of the daylight and early evening hours.

40 Meters: Higher static levels and a shorter period of darkness are expected to result in poorer DX propagation conditions on 40 meters during April. Some fairly good DX openings, however, are forecast to many areas of the world. The band should open for DX shortly before sunset, and remain open through the hours of darkness, until shortly after sun-

APRIL & MAY, 1962

TIME ZONE: EST

EASTERN USA TO:

	10*/15 Meters	20 Meters	40 Meters	80/160** Meters
Western & Central Europe	10A - 2 P (1) 2 P - 4 P (2) 4 P - 6 P (1)	5 A - 7 A (1) 7 A - 2 P (2) 2 P - 4 P (3) 4 P - 6 P (4) 6 P - 7 P (3) 7 P - 8 P (2) 8 P - 10P (1)	5 P - 7 P (1) 7 P - 8 P (2) 8 P - 11P (3) 11P - 12M(2) 12M- 2 A (1)	7 P - 9 P (1) 9 P - 11P (2) 11P - 12M(1) 8 P - 9 P (1)** 9 P - 10P (2)** 10P - 12M(1)**
Eastern Europe & European USSR	12N - 4 P (1)	2 P - 8 P (1)	7 P - 12M (1)	8 P - 11P (1)
Southern Europe & North Africa	2 P - 4 P (1)* 10A - 2 P (1) 2 P - 5 P (2) 5 P - 7 P (1)	4 A - 5 A (1) 5 A - 8 A (2) 8 A - 1 P (1) 1 P - 3 P (2) 3 P - 5 P (3) 5 P - 6 P (4) 6 P - 8 P (3) 8 P - 9 P (2) 9 P - 11P (1)	5 P - 7 P (1) 7 P - 8 P (2) 8 P - 11P (3) 11P - 12M(2) 12M- 1 A (1)	7 P - 8 P (1) 8 P - 11P (2) 11P - 12M(1) 8 P - 9 P (1)** 9 P - 10P (2)** 10P - 11P (1)**
South Africa	11P - 2 P (1)* 7 A - 11A (1) 11A - 2 P (2) 2 P - 4 P (1)	1 A - 6 A (1) 2 P - 4 P (1) 4 P - 6 P (2) 6 P - 8 P (1)	7 P - 9 P (1) 9 P - 11P (2) 11P - 12M(1)	9 P - 11P (1) 9 P - 11P (1)**
Eastern Mediterranean	1 P - 5 P (1)	4 A - 6 A (1) 2 P - 4 P (1) 4 P - 6 P (2) 6 P - 9 P (1)	6 P - 10P (1)	8 P - 10P (1)
Central Asia	NIL	4 P - 8 P (1) 6 A - 8 A (1)	6 P - 8 P (1) 4 A - 6 A (1)	NIL
Southeast Asia	NIL	1 P - 5 P (1) 7 A - 9 A (1)	NIL	NIL
Far East	4 P - 7 P (1)	6 P - 11P (1) 7 A - 9 A (1)	4 A - 6 A (1)	NIL
Samoa, Pacific Area & New Zealand	3 P - 7 P (1)* 2 P - 6 P (1) 6 P - 8 P (2) 8 P - 10P (1)	8 P - 11P (1) 11P - 3 A (3) 3 A - 6 A (2) 6 A - 8 A (3) 8 A - 10A (2) 10A - 2 P (1)	1 A - 2 A (1) 2 A - 5 A (2) 5 A - 7 A (1)	2 A - 6 A (1) 2 A - 5 A (1)**
Australia	6 P - 8 P (1)* 4 P - 7 P (1) 7 P - 9 P (2) 9 P - 10P (1)	10P - 7 A (1) 7 A - 8 A (2) 8 A - 10A (1)	3 A - 4 A (1) 4 A - 6 A (2) 6 A - 7 A (1)	4 A - 6 A (1) 4 A - 6 A (1)**
South America	10A - 5 P (1)* 6 A - 7 A (1) 7 A - 10A (3) 10A - 2 P (2) 2 P - 5 P (4) 5 P - 7 P (3) 7 P - 9 P (2) 9 P - 1 A (1)	5 A - 8 A (3) 8 A - 10A (2) 10A - 3 P (1) 3 P - 5 P (2) 5 P - 6 P (3) 6 P - 1 A (4) 1 A - 3 A (3) 3 A - 5 A (1)	7 P - 9 P (1) 9 P - 3 A (3) 3 A - 5 A (2) 5 A - 6 A (1)	9 P - 1 A (1) 1 A - 3 A (2) 3 A - 5 A (1) 12M- 3 A (1)**
McMurdo Sound, Antarctica	2 P - 4 P (1)* 1 P - 2 P (1) 2 P - 5 P (2) 5 P - 7 P (1)	5 P - 6 P (1) 6 P - 7 P (2) 7 P - 9 P (1)	12M - 6 A (1)	NIL

TIME ZONE: PST

WESTERN USA TO:

	10*/15 Meters	20 Meters	40 Meters	80/160** Meters
Western & Central Europe	NIL	6 A - 8 A (1) 12N - 3 P (1) 3 P - 4 P (2) 4 P - 8 P (1)	7 P - 10P (1)	NIL
Eastern Europe & European USSR	NIL	6 A - 8 A (1) 11A - 3 P (1) 7 P - 10P (1)	7 P - 10P (1)	NIL
Southern Europe & North Africa	12N - 4 P (1)	12N - 3 P (1) 3 P - 5 P (2) 5 P - 10P (1)	7 P - 10P (1)	7 P - 9 P (1)

TIME ZONE: PST (con't.)

WESTERN USA TO:

	10*/15 Meters	20 Meters	40 Meters	80/160** Meters
South Africa	11A - 2 P (1)	6 A - 8 A (1) 12N - 2 P (1) 2 P - 4 P (2) 4 P - 6 P (1) 9 P - 11P (1)	7 P - 9 P (1)	8 P - 9 P (1)
Eastern Mediterranean	NIL	6 A - 8 A (1) 2 P - 9 P (1)	NIL	NIL
Central Asia	6 P - 9 P (1)	7 A - 2 P (1) 8 P - 12M(1)	4 A - 6 A (1)	NIL
Southeast Asia	4 P - 9 P (1)	6 A - 7 A (1) 7 A - 10A (2) 10A - 1 P (1) 11P - 3 A (1)	3 A - 6 A (1)	3 A - 5 A (1)
Far East	7 P - 10P (1)	6 A - 7 A (1) 7 A - 9 A (3) 9 A - 12N (2) 12N - 3 P (1) 8 P - 10P (1) 10P - 1 A (2) 1 A - 3 A (1)	1 A - 2 A (1) 2 A - 5 A (2) 5 A - 7 A (1)	2 A - 3 A (1) 3 A - 5 A (2) 5 A - 6 A (1) 3 A - 5 A (1)**
Samoa & Pacific Islands	11A - 7 P (1)* 9 A - 10A (1) 10A - 1 P (3) 1 P - 4 P (2) 4 P - 7 P (3) 7 P - 9 P (2) 9 P - 10P (1)	4 A - 7 A (1) 7 A - 9 A (3) 9 A - 11A (2) 11A - 6 P (1) 6 P - 8 P (2) 8 P - 12M(4) 12M - 2 A (3) 2 A - 4 A (2)	11P - 1 A (1) 1 A - 5 A (3) 5 A - 7 A (1)	12M - 2 A (1) 2 A - 5 A (2) 5 A - 6 A (1) 2 A - 5 A (1)**
New Zealand	1 P - 2 P (1)* 2 P - 5 P (2)* 5 P - 7 P (1)* 10A - 12N (2) 12N - 4 P (1) 4 P - 6 P (2) 6 P - 8 P (4) 8 P - 10P (2) 10P - 11P (1)	6 P - 8 P (1) 8 P - 10P (2) 10P - 12M(4) 12M- 3 A (3) 3 A - 6 A (2) 6 A - 11A (1)	10P - 11P (1) 11P - 12M(2) 12M- 4 A (3) 4 A - 6 A (2) 6 A - 7 A (1)	12M - 2 A (1) 2 A - 4 A (2) 4 A - 6 A (1) 2 A - 4 A (1)**
Australia	2 P - 8 P (1)* 12N - 7 P (1) 7 P - 9 P (2) 9 P - 11P (1)	8 P - 10P (1) 10P - 12M(3) 12M- 3 A (2) 3 A - 7 A (1) 7 A - 9 A (2) 9 A - 1 P (1)	12M - 1 A (1) 1 A - 5 A (2) 5 A - 6 A (1)	12M - 2 A (1) 2 A - 4 A (2) 4 A - 5 A (1) 2 A - 4 A (1)**
South America	12N - 7 P (1)* 6 A - 7 A (1) 7 A - 1 P (2) 1 P - 5 P (4) 5 P - 7 P (2) 7 P - 10P (1)	1 P - 3 P (1) 3 P - 6 P (2) 6 P - 10P (4) 10P - 12M(3) 12M- 1 A (2) 1 A - 3 A (1) 3 A - 5 A (2) 5 A - 8 A (1)	6 P - 8 P (1) 8 P - 1 A (3) 1 A - 2 A (2) 2 A - 4 A (1)	7 P - 8 P (1) 8 P - 1 A (2) 1 A - 3 A (1) 8 P - 1 A (1)**
McMurdo Sound, Antarctica	1 P - 4 P (1)* 11P - 3 P (1) 3 P - 5 P (2) 5 P - 6 P (1)	10A - 12N (1) 4 P - 6 P (1) 6 P - 7 P (2) 7 P - 8 P (1)	3 A - 6 A (1)	NIL

TIME ZONES: CST & MST

CENTRAL USA TO:

	10*/15 Meters	20 Meters	40 Meters	80/160**Meters
Western & Central Europe	12N - 6 P (1)	5 A - 7 A (1) 1 P - 6 P (1) 6 P - 7 P (2) 7 P - 9 P (1)	7 P - 8 P (1) 8 P - 10P (2) 10P - 12M(1)	9 P - 11P (1) 9 P - 11P (1)**
Eastern Europe & European USSR	11A - 4 P (1)	5 A - 7 A (1) 3 P - 10P (1)	7 P - 11P (1)	NIL
Southern Europe & North Africa	1 P - 6 P (1)	5 A - 7 A (1) 1 P - 3 P (1) 3 P - 4 P (2) 4 P - 7 P (3) 7 P - 9 P (2) 9 P - 10P (1)	7 P - 8 P (1) 8 P - 11P (2) 11P - 12M(1)	8 P - 9 P (1) 9 P - 11P (2) 11P - 12M(1) 9 P - 11P (1)**

TIME ZONES: CST & MST (con't.)

CENTRAL USA TO:

	10*/15 Meters	20 Meters	40 Meters	80/160** Meters
Central Africa	2 P - 6 P (1)* 1 P - 3 P (1) 3 P - 6 P (2) 6 P - 8 P (1)	12N - 3 P (1) 3 P - 5 P (2) 5 P - 8 P (3) 8 P - 9 P (2) 9 P - 10P (1)	8 P - 11P (1)	9 P - 11P (1)
Eastern Mediterranean	2 P - 5 P (1)	4 P - 10P (1)	7 P - 9 P (1)	NIL
Central Asia	NIL	5 A - 8 A (1) 2 P - 7 P (1)	6 A - 8 A (1) 7 P - 9 P (1)	NIL
Southeast Asia	6 P - 9 P (1)	4 A - 6 A (1) 6 A - 8 A (2) 8 A - 11A (1) 7 P - 9 P (1)	5 A - 8 A (1)	NIL
Far East	6 P - 9 P (1)	6 A - 7 A (1) 7 A - 9 A (2) 9 A - 12N (1) 11P - 3 A (1)	2 A - 7 A (1)	3 A - 6 A (1)
Samoa, Pacific Area & New Zealand	3 P - 7 P (1)*	6 P - 8 P (1)		
	10A - 12N(1)	8 P - 10P (2)	11P - 3 A (1)	2 A - 6 A (1)
	12N - 5 P (2)	10P - 12M(4)	3 A - 5 A (2)	3 A - 5 A (1)**
	5 P - 7 P (3)	12M - 2 A (3)	5 A - 7 A (1)	
	7 P - 10P (1)	2 A - 4 A (2)		
		4 A - 7 A (1)		
		7 A - 9 A (2)		
		9 A - 2 P (1)		
Australia	6 P - 8 P (1)*	9 P - 11P (1)	3 A - 4 A (1)	4 A - 5 A (1)
	3 P - 5 P (1)	11P - 3 A (2)	4 A - 6 A (2)	5 A - 6 A (2)
	5 P - 7 P (2)	3 A - 7 A (1)	6 A - 8 A (1)	6 A - 7 A (1)
	7 P - 10P (1)	7 A - 10A (2)		4 A - 6 A (1)**
		10A - 3 P (1)		
Northern & Central South America	10A - 5 P (1)*	10A - 2 P (1)	7 P - 9 P (1)	9 P - 10P (1)
	6 A - 8 A (1)	2 P - 4 P (2)	9 P - 2 A (3)	10P - 2 A (2)
	8 A - 10A (2)	4 P - 6 P (3)	2 A - 4 A (2)	2 A - 5 A (1)
	10A - 2 P (3)	6 P - 9 P (4)	4 A - 6 A (1)	10P - 3 A (1)**
	2 P - 7 P (2)	9 P - 1 A (3)		
	7 P - 10P (1)	1 A - 4 A (2)		
		4 A - 6 A (3)		
		6 A - 10A (2)		
Argentina, Chile & Uruguay	1 P - 4 P (1)*	2 P - 4 P (1)		
	6 A - 8 A (1)	4 P - 6 P (2)	8 P - 10P (1)	10P - 3 A (1)
	8 A - 1 P (2)	6 P - 10P (4)	10P - 1 A (2)	10P - 2 A (1)**
	1 P - 3 P (3)	10P - 1 A (3)	1 A - 5 A (1)	
	3 P - 5 P (4)	1 A - 3 A (2)		
	5 P - 6 P (3)	3 A - 5 A (1)		
	6 P - 8 P (2)	5 A - 7 A (2)		
	8 P - 12M(1)	7 A - 9 A (1)		
McMurdo Sound, Antarctica	2 P - 4 P (1)*	10A - 12N (1)	12M - 7 A (1)	NIL
	12N - 1 P (1)	5 P - 6 P (1)		
	1 P - 5 P (2)	6 P - 8 P (2)		
	5 P - 7 P (1)	8 P - 9 P (1)		

FORECAST RATINGS

The numerical ratings appearing in parenthesis following each predicted time of band opening indicate the total number of days during each month of the forecast period that the opening is expected to occur, as follows:

(1) Less than 7 days
(2) Between 8 and 13 days
(3) Between 14 and 22 days
(4) More than 22 days

For the specific days of each month on which a particular opening is most likely to occur, as well as a day-to-day forecast of reception conditions (signal quality, noise and fading levels), see the "Last Minute Forecast" which appears elsewhere in this column.

* Indicates predicted 10 meter openings

** Indicates predicted 160 meter openings

A - A.M. P - P.M. N - Noon M - Midnight

The CQ DX Propagation Charts are based upon a CW effective radiated power of 150 watts at radiation angles lower than thirty degrees. The Eastern USA Chart can be used in the 1, 2, 3, 4 and 8 call districts; the Central USA Chart in the 5, 9 and Ø districts, and the Western USA Chart in the 6 and 7 districts. The Charts are valid through May 31, 1962. Propagation forecasts contained in these Charts are derived from basic ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

rise. Forty meters is expected to be the best band for DX during the late evening and early morning hours. Good daytime short-skip openings are forecast for distances between 100 and 750 miles, and night time openings between 300 and 2300 miles.

80 Meters: Despite higher static levels, some fairly good DX openings are forecast to some areas of the world during the hours of darkness. However, the band will not open as frequently as it did during the winter months; openings will be for shorter periods of time, and signal levels noticeably weaker. Regular short-skip openings between 50 and 250 miles are forecast for the daylight hours, while short-skip openings between approximately 200 and 2300 miles should be possible during the hours of darkness.

160 Meters: W1BB's reports of record breaking DX propagation conditions on 160 meters during this past winter appear to confirm the predictions made in this column that conditions on this band would improve considerably as the sunspot cycle declined. The "Top Band" opened for DX frequently during the nighttime and early morning hours of the winter months, and W1BB reports the following DX *firsts* on this band: Hawaii to South America (KH6IJ-HC1AGI); Hawaii to Bahamas (KH6IJ-VP7NY); South America to New Zealand, where it was the middle of the *summer* (HC1AGI-ZL3RB); South Orkney's to South America (VP8GQ-HC1AGI); South Orkney's to USA (VP8GQ-WØIFH, followed by VP8GQ-W1BB/1); and South Orkney's to Canada (VP8GQ-VE1ZZ).

Some nighttime DX openings are forecast for 160 meters during April, although they will be somewhat less frequent, and considerably noisier than during the winter months. No daytime openings are expected due to intense ionospheric absorption, but short-skip openings up to approximately 2300 miles should be possible during the hours of darkness.

V.H.F. Ionospheric Openings

The increase in Sporadic-*E* propagation that usually takes place during April is likely to result in some 6 meter short-skip openings over distances between approximately 1000 and 1400 miles.

A relatively large number of aurora-type v.h.f. openings are likely to occur during April. Check the "Last Minute Forecast" at the beginning of this column for those days that are expected to be "below normal" or "disturbed". V.h.f. auroral openings are most likely to occur during these periods.

There's a good chance for some v.h.f. meteor-scatter openings to occur between April 19 and 23, when the *Lyrids* meteor shower is scheduled to take place.

Sunspot Cycle

The Zurich Solar Observatory reports a monthly sunspot number of 38 for January

[*Continued on page 98*]

A Preliminary Report:

1961 *CQ* WW DX Contest

BY FRANK ANZALONE*, W1WY

THE 1961 *CQ* World Wide DX Contest will probably go down in DX history as being one of the most interesting we have ever held.

To begin with, everybody was apprehensive of what lay ahead. Due to the declining sunspot cycle, generally poor conditions were expected, and everyone was prepared for the worst.

That's just about what happened for the phone week-end in October. However, the c.w. week-end in November was another story, much to everyone's surprise. Even W3ASK was scratching his head, wondering what happened. If you have not already done so, I strongly recommend you read George's DX Contest Post Mortem in his February column. His explanation of what happened is much more descriptive than I could ever put across.

From a contestant's viewpoint, the Phone week-end was a real rough one. Quoting W2SKE, one of the operators at multi-K2GL, "I have never worked so hard in a contest and had so little to show for it in my life." And Bill has got quite a few brawls under his belt.

This however did not seem to be the case all over the world. Some sections in the southern hemisphere experienced conditions almost opposite to those we were struggling with in the barren north.

During the more productive c.w. week-end the northern boys were having a ball on 15, 20 and 40, while south of the Equator the going was not so good in some areas. The 10 meter band was pretty spotty all over and 80 didn't receive much attention because of the QRM, mostly from sources other than ham radio.

The old standby 20 bore the brunt of the activity although 15 was really humming while it lasted. However, it was the low end of 40 that was the big surprise. Even the East coast boys were working the JAs as late as 1330 GMT. If they had a beam and the power to back it up, that is.

A cross-section of the comments on the logs will probably better illustrate on just what did happen the last two week-ends last October and November. Taking the Phone section first. . . .

W8NGO, Doc had to say, "When we got bored looking at the empty green face on the 'scope, we went outside and watched the beautiful display that George arranged in the northern sky."

Poor George, he really took a beating from the phone boys this year. Actually he had predicted normal conditions for the Phone contest.

All the operating difficulties were not caused by the poor propagation. The boys at WØHNS suggested we attempt to foster more cooperation from stations not in the contest. And VP9AK thought that 80 could stand more activity. Said Clarence, ". . . those 75 meter phone men were just not interested."

OD5CN—Aref N. Mansour, who made 214 contestants happy on 14 mc phone. However, not one from the USA.

This problem is even more evident on the 40 meter band. They not only are not interested, but also resentful of any intrusion on their pet channel where they hold forth night after night. "The bands are cluttered up with contest activity ever week-end," they complain. This of course is a gross exaggeration. Although there are contests scheduled for a majority of the week-ends for nine months out of the year, very few of them stir up enough activity to make them objectionable. As a matter of fact, the major phone contests can almost be counted on the fingers of one hand. No, I can't see any cause to complain.

KH6DLD wants to know if some of those VKs know what zone they're in. How about some of our W/Ks, Sheila? Man! the Zone 1 and 2 credits we had to scratch because some of our guys were giving out wrong zone numbers.

Incidentally both Sheila and her husband Ed, KH6DLF are now back in W1 land, probably for good.

Still out in the Pacific, ZK1BS was caught with his beam down. "Boy," said bill, "a man's a real square without a beam. No one, but

*Chairman, *CQ* Contest Committee.

no one would speak to me." Which goes to show you, that even with an exotic call like ZK1 you're just another hetrodyne if you don't have a beam.

Sometimes it works in reverse. KW6DG was patiently waiting for the boys in the States to get around to calling him, but very few ever did. The way Layne figured it out was that the boys were searching for DX in the east, planning to swing their beams west later. But when they finally got around to it, Pow! Too late, the skip to the Pacific was out.

That's a fact, the bands were closing down much earlier than in previous years and a lot of the fellows missed out. However things worked out much better for him in the c.w. contest. Layne, ex-KØSLD will be headed home soon and join the W/K QRM.

Some of the fellows want the contest time cut down or the operating time limited. This could actually be a disadvantage, what with the deteriorating conditions and week-end obligations.

Some of the EP gang visiting EP2BB. Standing, l. to r.: EP2BC, EP2BN, EP2AF, and EP2AG. Sitting: EP2AP, EP2BB, and EP2AQ. Of the group, AF, AG and BB were in the Contest.

WØAIH/VE3, the Rev. Bittner commented that "week-end contests and ministry don't mix very well." You're so right Reverend, but why not confine your operation to a single band next time?

K2GXI was on 7 mc. Said Bob, "always a good contest, good to stay on one band, got plenty of rest." And Sparkie on 21 mc at W4NQM. "band closed up early, got a chance to get a good night's sleep."

However some slight changes might be given consideration in other areas. GW3CDP thinks 0000 GMT would be a better world wide starting time. And some of the fellows are still complaining that the 12 hour minimum opeating time required for an award is to long.

They might have a point, now that the bands are closing down so early. Well, what do you think? We're open to suggestions.

G3LNG, George, wants a.m. and s.s.b. judged separately and Uri, 4X4OC wants s.s.b. excluded in the contest. Heck! Without s.s.b. there wouldn't have been a contest. Most of the top scorers used sideband almost exclusively. Why fight it? "If you can't beat 'em, join 'em."

The "little lady" was frequently listed as an operating aid. VU2NR even had his ex-YL rotating beam. Not so at CT1HX however. Henri said his wife tried to drag him off to a party, but it didn't work. Coffee was the big stimulant, but some of the other aids had better be left unmentioned. Hi!

The appearance of HV1CN on all bands was probably the high point of the contest. Manned around the clock by Max, W2BIB, Sy, W2BBV and Dom, I1CNS, they did a swell job under trying conditions.

The c.w. chores were taken over by Larry, W9IOP and Al, W8DUS. Between the two of them they ran up the highest contact total ever made by a two man team. For that story see page 37 in this issue.

And now continuing the c.w. story let's see what the happy brass-pounders had to say.

W4KFC, Vic. "This year I had decided to limit my operating time only to those periods when conditions were good. However it seemed they were always good and I ended up putting in a total of 44 hours." And when Vic puts in that many hours you can be sure he wasn't just listening.

Most all the big scores were run up on 20, but it was the 40 meter band that gave the boys that once in a life time thrill.

W6NKR never heard anything like it, when the 7 mc band opened up, Europe was coming thru like on 14 mc.

Said K2DGT, Bob. "This contest, at least the 7 mc portion of it, will be remembered as the day 40 went crazy. I'm referring to Sunday morning between 1219 and 1337 GMT. On my 2nd CQ with my beam northwest, I was sure that the station that came back to me was a W8 looking for a zone 5 multiplier. I could not believe my ears when he signed JA1CC. What happened after that left me stunned, one JA after another, with signal strength of S7 and better. What a thrill."

In the late afternoon and early evening the path to Europe was wide open and UAØKYA in Zone 23 was coming thru as early as 7 P.M. here on the East coast. However nobody was working him. You are going to see some eye opening scores on 7 mc.

But it seemed that you did need a beam and some power to get anywhere. Quote Bob, W4OMW, "I felt like a voice in wilderness with my 250 watts and no 40 meter beam."

VS9AAC, Alan, gave all the bands a try but didn't hear a single signal on 28, 3.5 or 1.8 mc.

It wasn't quite that bad in all sections of the world, even 10 had its moments.

VK2GW, Lyell, found 28 mc very spotty, but wide open at times, only nobody bothered to stick with it.

And 80 also showed activity but PAØVB, Peter found it almost impossible to work DX thru the European QRM.

There was European activity on 160 but none of it got across to us. About the only

[*Continued on page 118*]

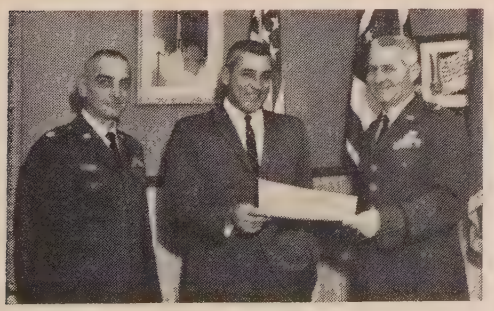
BY WALTER G. BURDINE, W8ZCV
R.F.D. 3, WAYNESVILLE, OHIO

Novice

I HAVE just received the February issue of *CQ* containing my first effort as your Novice editor. I am still writing this column blind, as I have received few letters from you, my readers, and I am more or less just trying to figure what I would want in the column if I were a Novice or Technician licensee. I am trying to help those of you, who want a General license, to get the feel of things. I feel you would have no trouble getting that General, if you wanted it bad enough to study hard and keep at it until you have mastered the code well enough to pass. If you have a Technician license you've proved that you know enough theory and you can get that "13 per" with practice.

Some of our older hams licensed recently say they are sorry they fooled away so much time getting licensed. Bob Kessler, K8VOT says that his Technician ticket is his second birth certificate, and, believe me, he is not having any regrets about the time spent in getting that ticket. I know of no better hobby for the older people to get started at than amateur radio, try it and some of the younger folks will gladly give you a helping hand. Just let it be known that you are willing to study a little and see what you have been missing, you could even ask for help through the NOVICE COLUMN help wanted section.

I'll try to cover enough theory in this column to get you going and at the same time to make it interesting enough to make you want to keep at the studying enough to get your license. Just don't forget, nobody can get you licensed but yourself, so subscribe to *CQ* and get on the ball. This was not a paid Commercial, it was only an offer of loads of fun and happy moments for the rest of your life.



Ernest J. Conversano, WA8BGY, 2904 Blackhawk Road, Kettering, Ohio (center) has every right to be happy as he accepts a certificate for the completion of the "Economics of National Security" course from Brigadier General William W. Veal (right), Commander of the Dayton Air Force Depot. Lt. Col. Jack B. Workman (left), director of Supply and Transportation poses with Ernie.

Please . . .

I would like to hear from any ham or reader in the Covington, Indiana area who would be willing to offer a helping hand to a deserving young man in that area that is desirous of becoming a ham but has met with misfortunes too big to overcome. His dad may be interested in amateur radio soon. If you would like to help, I'd be glad to send you a copy of his letter. Thank you both for myself and for him.

Charles D. Coyle, K9PQI, 620 N. Catherine Ave., La Grange Park, Illinois sends this announcement. The Lyons Township High School Radio Club, W9MTJ, a Grange will be on the air weekdays between 2100 and 2200 GMT. This club has quite a few novices and will operate primarily in the 80-40-15 meter novice bands. They would enjoy having QSOs and exchanging QSLs with everyone they work. Look for them when you are on the air.

Converters

There are many Novices who would like to improve their receiving capabilities on 15 meters in those elusive DX stations and push that old S meter a little higher on the scale. With this thought in mind I'm sending along the constructional data on the converters in use at W8ZCV. I have two models of this converter for 15 meters; I like to try different converter-receiver combinations, using different intermediate frequencies and antennas. This is the reason for the cathode follower output. A new model was constructed using an i.f. amplifier to boost the signal at the i.f. before feeding that signal into the receiver. This helped bring in those hard-to-get boys so that they could be read without any difficulty.

The cathode-follower was built to work with almost any receiver that was in the shack at that time. I have used it on the very popular surplus BC-454 and BC-455, the BC-652 and numerous other receivers including some good commercial receivers. A converter will help any receiver. By using a converter you will make a double-conversion receiver out of any receiver that you are now using and if the receiver is a double-conversion receiver, you will have a

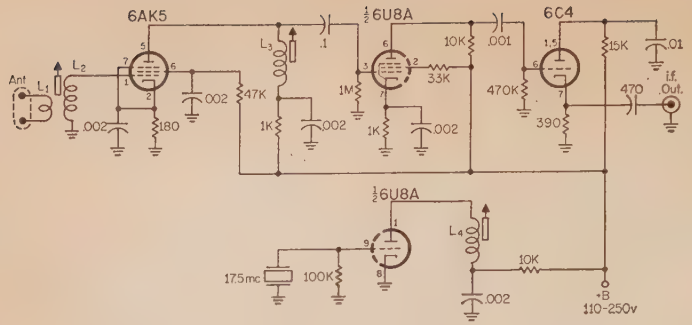


Fig. 1—Schematic diagram of a crystal controlled 15 meter converter having output from 3.5-4.0 mc. All capacitors are disc ceramic and all resistors are ½ watt.

L_1—3t #24e. wound on ground end of L_2.
L_2—15t #24e. wound on ½ inch slug-tuned form.
L_3—15t. #24e. wound on ½ inch slug-tuned form.
L_4—23t. #26e. wound on ½ inch slug-tuned form.
L_5—A single layer wound coil to resonate at the i.f.
L_6—Same as above.
L_7—4t. plastic covered hook-up wire wound on ground end of L_6 and fed to receiver antenna terminal.

triple-conversion receiver. There is always one signal conversion in the converter. The double- or triple-conversion receiver is not an answer to all of your receiver troubles, sometimes it just adds to your troubles. I will take that up another time as it will take more space than we have this month.

With the cathode-follower, the i.f. can be changed by merely changing the crystal, tuning the oscillator coil to resonance and of course tuning the receiver to the new i.f. This gives you the advantage of being able to use the converter with any receiver that you happen to acquire from the war-surplus stock-room. Another reason for this model is being able to use it with the automobile receiver to receive 15 meters in the car. This makes a very sensitive and versatile receiving set-up with the addition of a b.f.o.

Changing the i.f. of the i.f. amplifier model isn't as easy because the amplifier coils must be changed to tune the new i.f. and this is quite a task. These coils will have to be broad-banded enough to pass the group of frequencies to be received, in this case, about one half megacycle. To change the i.f. of the amplifier model would require a new crystal and new amplifier coils and of course tuning the receiver to the new frequency. If you are limited to one receiver and you can find an i.f. where there is no interfering feed-through, then use that frequency and you'll get good reception with this converter.

By the way, I've been asked many times by people just starting in the amateur hobby the question "just where do you hook into the receiver for the i.f. connection?". Another question asked frequently is, "How do you figure your i.f.?" I will attempt to answer both of these questions here for you.

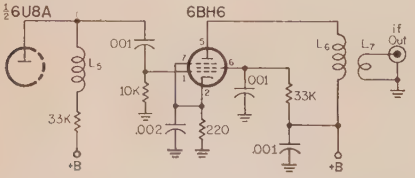


Fig. 2—Alternate i.f. amplifier circuit for use with the 15 meter converter of fig. 1. A higher output level is achieved with this circuit.

A converter is connected in series with the antenna lead-in. In other words the antenna is dis-connected from the receiver and hooked to the input of the converter and the output of the converter is fed into the antenna terminals of the receiver, thus in effect changing the receiver to a tunable i.f. amplifier with all controls of the receiver performing their usual function. There is no actual connection to the i.f. of the receiver in question. The receiver is then tuned to the output frequency of the converter and receives the signals that appear on the input of the converter. The converter does exactly what the term indicates, it converts one frequency (from the antenna) to another frequency (the i.f. selected) through hetrodyne action of the crystal controlled local oscillator. The converter is just the front end of a superhetrodyne converting a high frequency signal to a lower frequency that can be tuned in on your present receiver. A crystal-controlled oscillator is often used in a converter to increase the stability of the received signal. The stability of a self-controlled oscillator decreases as the frequency increases. This is one reason that we use a lower frequency for the tunable i.f. amplifier. As with any receiver, use the best antenna system that you have for the converter.

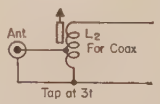
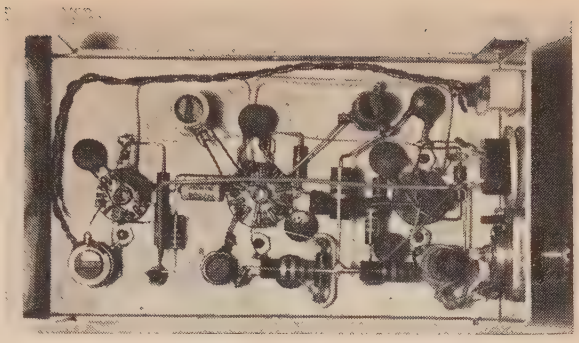


Fig. 3—Alternate input coil for the 15 meter converter of fig. 1 permitting unbalanced or coaxial input rather than balanced line. Coil L_2 is the same as in fig. 1.

It is a very simple problem to find the right crystal to use in the converter to obtain the chosen i.f. output. First determine the i.f. output that is needed for your receiver. Then choose the frequency you want to receive and subtract the i.f. from the signal you want to receive. The difference is the conversion oscillator frequency. If the oscillator frequency is too high for any available crystal, the crystal

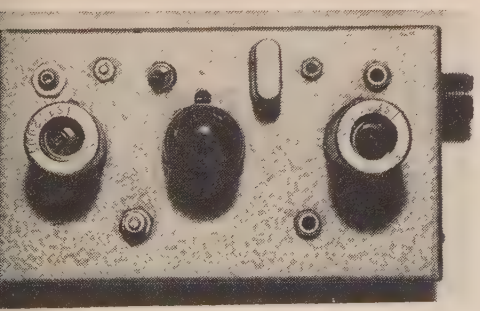


Bottom view of the W8ZCV 15 meter converter showing general layout of components. The crystal socket on the right wall of the Minibox is for the balanced antenna input while below it is the power connector.

frequency must be multiplied electrically and injected into the mixer tube to get the difference frequency or i.f. The 15 meter band is 21.000 to 21.450 mc. This is the frequency that we want to receive. We have a receiver with bandspread on 3.5 to 4.0 mc so we will choose this as our i.f. Now suppose we subtract 3.5 mc (the beginning frequency of the chosen i.f.) from 21.000 mc (the beginning of the 15 meter band) and we get 17.5 mc. This is our oscillator frequency. The coils in the plate circuit must tune 3.5 mc to 4.0 mc so that there is no attenuation of the band edges.

This same method is used to determine the oscillator frequency of converters for any other bands except that a multiple of the crystal frequency may be used for the injection frequency. The crystal frequency may be multiplied as much as a hundred or more times to obtain the injection frequency. Tuning the receiver from 3.5 to 4.0 mc covers the full 15 meter band after the converter has changed the 15 meter band to that i.f. Reading your *Handbook* will give you all the information you can use on the subject.

I have used this converter with a BC-455 to work about 50 countries and recently obtained an HRO-60 but did not get the 15 meter bandspread coil so I took this method of spreading the 15 meter band out so that I could dig out some of that DX. The 17.5 mc crystal was my only cost in construction of this converter, the rest of the parts came from a well stocked junk-box.



Top view of the 15 meter converter used at W8ZCV. This model uses a 6C4 cathode follower i.f. amplifier (fig. 1) instead of the 6BH6, etc. as shown in fig. 2. Tube lineup from left to right 6AK5 r.f. amp., 6U8A oscillator-mixer and 6C4 cathode follower amplifier. Along the top edge are L_2, L_4, Y_1 and L_6 while L_3 and L_5 are at the lower edge. The i.f. output connector is at the right

15 Meter Converter

The 15 meter converter described above is quite simple. It was built on a $2\times3\times5\frac{1}{2}$" Mini-box and if built carefully it will make a BC-455 receive 15 meter signals almost as well as receivers in the $250 class.

This unit is simple enough to be built by any Novice if he has the proper tools and has access to a good grid dipper to adjust the coils to the right frequency. The coil data for both my units may need some pruning. The cathode-follower model will work well and data is given for all models. Different tubes may be used by those well enough acquainted with converter circuitry to make the necessary changes. The same general lay-out should be followed to prevent possible circuit interaction. The plate voltage may be anything from 110 volts d.c. to 250 volts d.c.

Although the popular 6AK5 is used in the converter in fig. 1, the less expensive 6CB6 or 6BH6 may be used. The improvement in sensitivity of the converter is not worth the five dollar tab on the 6AK5.

The same circuit is in use at my station for converters used for 15, 10 and 6 meters and they all perform as well as any ever used at this station.

First Novice CHC Award!

Ross Kirk, KN8YBU, 901 Sixth Avenue, St. Albans, West Virginia, is the first Novice to obtain the coveted CHC-25 award issued by K6BX. At the time of receiving the award Ross had worked 85 countries and WAS. Some of the more difficult awards are included in his collections. Ross' outstanding operating performance is sufficient proof that a large number of awards can be obtained by Novices. The prime requisites are operating ability and perseverance.

Ross has since obtained his General class license and has worked over 100 countries. He recently installed a tri-band Quad antenna and should be well up the DX ladder before long. He is now feeding this antenna with a Johnson Viking Kilowatt driven by a Viking Ranger.

Ross Kirk, KN8YBU at the operating position of his fine rig. Ross is the first Novice ever to receive the CHC-25 award issued by Clif, K6BX.

Ross is indeed to be congratulated for this outstanding feat, and may I wish him the best of DX.

Letters

Sven Elfving-SM3-3104, Solgardsgatan, 15, Ornskoldsvik, Sweden writes: "Hi there, I saw in the January issue of *CQ* that there were no reports from foreign countries, so here is one. Though I'm quite busy nowadays I have been listening for Novices now and then and lo and behold I have logged the following stations: KN7PFV, 10 Dec. at 0848 GMT on 7190 kc with RST 559. I need his mail QTH and state for my "40-Novice-HAS". I have 36 states (novice) logged on 40 c.w. so far. I also logged a WV6SLT or SLX, I'm not sure of the last call-letter, could anyone help? It was on 28 Dec. at 0910 GMT on 719 kc, RST 599. I logged WP4BDM the same day at 0913, RST 556-9. I hear lots of WV2's, KN1's etc. on 40 c.w. I will try for more West-coast novices around 0700-1000 GMT here on 40 in the mornings. I would like to hear from any DX-minded novices and I will sure listen for you boys, so 73 and gud hunting from Sweden and SM3-3104."

There you are fellows and gals, you are being heard on the other side, now tune up that old receiver and put up a better antenna, improve your operating habits and listen down to the third layer of QRM and you may be surprised to hear some DX stations calling you and boy that sure is a thrill.

Anthony B. Plant, G3NXC, 178 Clay Lane, South Yardley, Birmingham, 26, England writes the following:

"Dear OM: When conditions are reasonable I like to tune the Novice bands to give a few Novices their first G contact (and net some new states for myself). However I am unable to send QSL's to some of these Novices either because they fail to give an address or leave it so late in the QSO that QSB and QRM have combined to make it impossible to copy their QTH. I have enclosed a short list of Novices worked recently whose addresses were not received and wondered if you could help these Novices and myself by publishing their calls and my QTH in your column.

"Perhaps whilst on the subject of novices I could air a pet beef.

"It is about those stations who call CQ DX and return to near locals. I wear out more fingers calling these fellows than by working them.

"I hope to improve the probability of having contacts by pouring my 50 watts into a G4ZU beam instead of my present "wet string" multi-band dipole.

"I am also looking for pen-pals of about my own age (25). 73, Anthony"

The attached list are G3NXC's c.w. contacts with Novices: KN1QXM, KN1TAD, WV2QHE, KN3OVJ, WN4ACV, KN8WXU and KN1DXM. Ok fellows let's get those QSLs over to Anthony and add G to your countries worked.

"Dear Sirs: Please inform me what procedure should I take to join an s.w.l. club. I am in this country now for one year and used to be active from Cuba as CO8BS. I am the brother of VE3EBN.

"Be good enough to publish my new address and I would appreciate hearing from any of the fellows that I used to work. Thanks for your kind attention and 73." So writes Victor Squires, 295 Willis Avenue, Apt. 4, Bronx 54, New York.

The above brings to mind another matter of importance to Amateur radio. Did you take the time to write your Senator and Representative of your views on reciprocal licensing? Senator Barry Goldwater, ex-6BPI and the late Senator Andrew F. Schoeppel (see page 29) introduced a bill in Congress to authorize the Federal Communications Commission to issue amateur licenses to citizens of other countries, provided they also grant such priviliges to our amateurs, while living there, or while making a DXpedition to their country.

[*Continued on page 102*]

I'm warning you v.h.f.ers attending the Dayton Hamvention, April 28, stay off 145.8 mc or suffer the Wouff-hong and the Rettysnitch from these Bedlam Net members. May heaven help you. Standing l. to r. Gene Weaver, K8MFU, his dad, Gene, KN8ACJ Tony, K8RSQ, Army, K8JZL, Bill, K8TDN, Virda K8TKL Charlie K8WZG and Red, K8OWC. Laying down on the job are Bob, K8VOT, John, K8ORC and Ev. K8VEC.

Space Communications

GEORGE JACOBS, W3ASK
11307 CLARA STREET,
SILVER SPRING, MARYLAND

THE first communication satellite, ECHO I, launched on August 12, 1960, is still in orbit. After nearly twenty months in pace, ECHO's 0.0005 inch thick aluminized ıylar plastic skin is still useful for reflecting adio signals, despite intensive battering by ıicrometeorites.

Originally a 100 foot diameter sphere, ECHO's shape is now distorted so that it is o longer a smoothed-surface sphere. However, still retains about 40% of its original effec-iveness as a passive reflector of radio signals ı the u.h.f. and lower microwave regions of he spectrum.

ECHO has demonstrated the feasibility of sing inflatable satellites as passive reflectors f radio signals. During its present lifetime, ECHO I has chalked up many accomplishments. Among the most important are the experi-ıental transmission of:

Telephone conversations between the east nd west coasts of the United States.

Facsimile photographs and speed mail (let-ers sent by a radiophoto process).

Voice and music between the United States nd England.

Radio frequency energy between the United tates and France.

When launched, ECHO I's orbit was nearly ircular at approximately 1000 miles above the arth. Because of its large size, it is extremely ensitive to pressures caused by solar radiation nd air drag. This has caused its orbit to shift rom nearly circular to an eliptical path, whose istance from the earth varies seasonally.

ECHO I's large size, and its high efficiency for reflecting light, has made it the easiest Satellite to spot in the night sky, and it has been seen by countless millions of people in almost every corner of the world. It is expected to remain in orbit for at least another year.

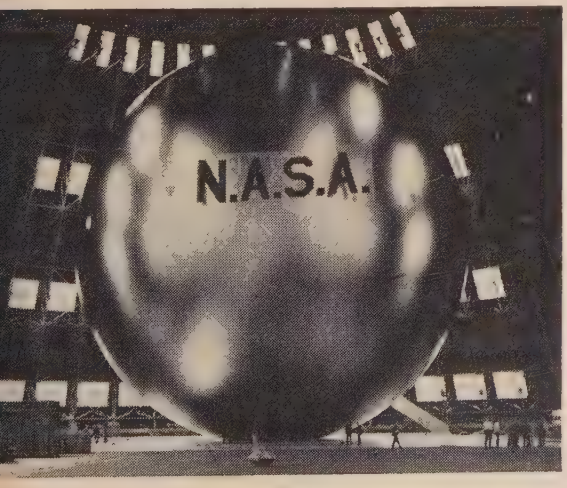
ECHO II

The National Aeronautics and Space Administration (NASA) has recently announced that it has developed a larger, much improved version of the ECHO I passive communication satellite.

Dubbed ECHO II, NASA's latest balloon satellite will be a 135 foot diameter sphere, rigidized with a frame of laminated aluminum and mylar plastic. The resistance of the outside skin to buckling will be twenty times that of ECHO I, and it is expected to retain its spherical shape in the space environment for a longer period of time than ECHO I.

ECHO II will have aboard two v.h.f. tracking beacon transmitters operating on 136 mc, powered by a storage battery and solar cells. Tracking will be performed by the world-wide NASA Minitrack network.

Earlier this year, NASA launched into a sub-orbital path a Thor vehicle containing a 41 inch canister into which was folded an uninflated ECHO II sphere. The purpose of the launch was to test the canister ejection mechanism and the balloon inflation technique. No communication experiments were conducted during this test. Aboard the Thor, in a recoverable capsule, were two motion picture cameras



Shown here is ECHO II, the 135 foot diamater rigidized inflatable balloon satellite which NASA plans to launch this coming summer as a passive reflector of radio signals. When folded, the satellite is packed into the 41 inch diameter canister shown in the foreground. *(Official NASA Photo).*

which photographed the sphere as it inflated, as well as a low definition TV camera which flashed pictures of the inflation back to scientists and engineers viewing the tests at Cape Canaveral.

The folded 135 foot diameter balloon was ejected successfully from its canister, but blew apart as it inflated, apparently due to too rapid an inflation rate. Additional tests are planned for the early spring.

Radio Amateur Participation In ECHO II Experiments

Raphael Soifer, K2QBW, Director of the Office for Satellite Scatter coordination at MIT (OSSC), reports that OSSC, in coordination with NASA and ARRL, is planning a program of dissemination and research to assist "serious v.h.f. radio amateurs who have equipment capable of working 300-400 miles with ease on 2 meters" in utilizing the ECHO II satellite for long distance communications.

According to Ray, it may be possible to communicate up to 1500 miles, or beyond, on two meters, using ECHO II as a passive reflector. The power required will be on the order of a kw, and a high gain, steerable and tiltable antenna will be necessary for tracking the satellite. Ray further suggests the introduction of polarization diversity into the array, to combat fading due to Faraday rotation.

Radio amateurs having two meter equipment of this magnitude, or who are willing to construct such equipment, can obtain additional details for participating in ECHO II experiments directly from Ray at the following address:

Raphael Soifer, K2QBW, Director, OSSC, Room 10-206 (CQ) MIT, 77 Mass. Ave., Cambridge 39, Mass.

TIROS IV

On February 8, NASA successfully launched the fourth satellite in its TIROS meteorological series. Equipment on board TIROS IV is very similar to previous satellites in this series. Two wide angle vidicon television cameras photograph cloud formations over vast areas of the earth's surface. This information is sent back to NASA receiving stations on the ground, upon command, from two transmitters on board the satellite operating on 235 mc, with a power level of 2 watts. The satellite also collects infrared radiation data, which is transmitted back to earth on a frequency of 237.8 mc. The power of this transmitter is also 2 watts. In addition, two tracking beacons transmit continuously on 136.23 and 136.92 mc, with power levels of 50 milliwatts. For more technical information about the TIROS satellites, see SPACE COMMUNICATIONS in the September, 1961 issue of *CQ*.

Amateur Rocket Experiments

Donald Heskett of Lubbock, Texas recently reported the successful launching of his home-made rocket, TV-1B, to an altitude of 2087 feet. This 10 inch tall, tri-stage vehicle was designed by Donald to test staging concepts and aerodynamic heating. According to Donald, data from this successful launch will be used for designing a larger vehicle which he hopes to rocket to an altitude of 100,000 feet later this year. His long range plans, part of a science project, are to launch two rocket sondes to an altitude of between 70-80 miles.

The 135 foot diameter ECHO II balloon tears apart during a sub-orbital ejection and inflation test flight on January 15, 1962. This photo was taken from a movie camera mounted on the Thor vehicle, which was retrieved after the flight. *(Official NASA Photo).*

For the 100,000 foot firing, Donald is constructing a two stage vehicle, about one foot long. For visual and radar tracking, and altitude determination, the probe will contain about an ounce of sodium, which will vaporize and be released at maximum altitude.

The small ionized cloud which will form from the vaporized sodium may be capable of reflecting v.h.f. radio signals over distances of several hundred miles. Donald would like to hear from radio amateurs within a radius of 300 miles of Lubbock who may want to participate in v.h.f. radio experiments along with the rocket launching. Anyone interested in such experiments should get in touch directly with Donald Heskett at the following address:

308 McGuire Street, Reese A.F.B., Texas.

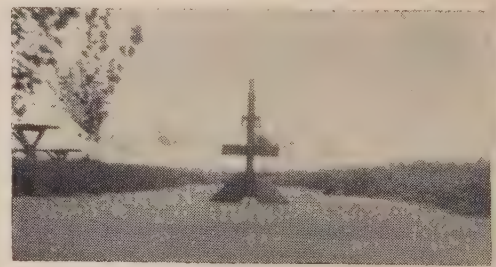


Photo showing the tri-stage amateur rocket, TV-1B, recently launched successfully to an altitude of 2087 feet by its builder, Donald Heskett of Lubbock, Texas. V.h.f. radio experiments are planned from ionized clouds that are to be released from future, higher rocket launches in this series.

OSCAR I, Au Revoir

Accurate information is now available describing the last days of OSCAR I.

The radio amateur satellite, launched December 12, 1961, remained in orbit, telemetering information to radio amateurs and other observers throughout the world, until revolution # 282 on December 30. By then, the battery voltage, which was designed to last approximately three weeks, dropped sufficiently to cause the "HI" transmissions to cease. Throughout December 30 and 31, OSCAR's 145 mc transmitter continued to operate with a weak continuous carrier, broken intermittently by dots and an occasional "HI."

With the start of the New Year, OSCAR's batteries deteriorated further. Amateur radio stations VE2AME, K2QBW/1 and K3CFA reported reception of OSCAR's weak, intermittent carrier on January 2, during revolution # 324. Nothing further was heard from OSCAR until orbit # 339 on January 3, when G2DQ reported reception of the very weak carrier. It appeared that this was OSCAR's final transmission.

For the next five days nothing was heard from OSCAR, although its frequency was monitored by hundreds of observers in all corners of the world. Then suddenly, on January 8, DU1CE in the Philippines heard a weak carrier on 145 mc. Orbital data shows that OSCAR was on its 413 revolution at the time, and passing over the eastern coastal areas of China, within radio distance of DU1CE's QTH in the Philippines. It seems fairly certain that DU1CE was the last to copy OSCAR, since no further reports have been received.

The OSCAR payload continued in a decaying orbit for several weeks after its transmitter failed, and radar tracking stations continued to plot its course, as they do all satellites in orbit. On January 31, 1962, OSCAR re-entered the earth's atmosphere and burned up, thus closing the first chapter to one of the most exciting events in the history of amateur radio.

OSCAR I RESULTS

By mid-February, more than 5000 separate OSCAR observations had been reported by nearly 600 observers in more than 26 countries. Reports were still arriving at Project OSCAR headquarters by surface mail from distant points.

From these reports, the radio amateur data reduction group of the OSCAR Association has accurately determined the temperature of the satellite during its life, the orbital parameters, and valuable propagation information. The quality of most of the reports received were excellent, and many reporting stations provided data which rivaled the capabilities of professional tracking stations. The complete results of the OSCAR I experiment will be released in a special report during early April. The report will be made available to radio amateurs and other interested observers throughout the world, and is scheduled to appear in this column next month.

One interesting result of the OSCAR I experiment is the wide geographical area over which the satellite was heard simultaneously, with strong signal strength. For example, during orbit # 46, W4ZAJ in Alabama reported hearing OSCAR at the same time that it was heard by W6CBE in California, W5TFY and W5AQS in Texas, and KØREE and KØLAD in Kansas. What a 6 way QSO this would have been had OSCAR I been a radio repeater satellite!

Along the same line, orbit # 164 would have resulted in a record breaking 2200 mile QSO between W4FWH in Georgia and WA6VJG in California, who both heard OSCAR simultaneously. Orbit # 113 would have made possible a record breaking European QSO among EA4AO in Spain, SM6PU in Sweden and I1BBB in Italy!

OSCAR II

In order to allow greater participation by radio amateurs throughout the world (thousands missed getting equipment ready in time for OSCAR I), and to obtain additional information, much of which may eventually be used for a radio amateur repeater satellite, OSCAR II will be a duplicate of OSCAR I, with minor changes in the keying circuit and a slight increase in power.

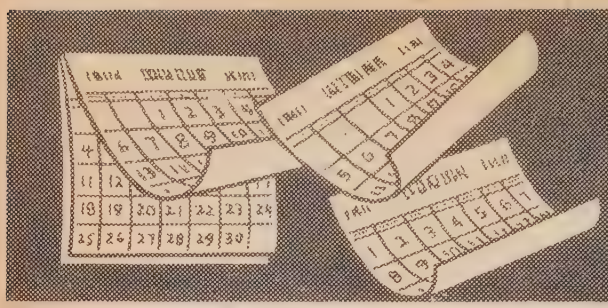
The OSCAR II payload has been completely fabricated, environment tested, and is ready for launch. Negotiations continue in Washington for a spring launching of OSCAR II, but nothing definite can be reported at this time (mid-February).

It is planned to place OSCAR II in a south-north orbit, similar to OSCAR I. The launch will probably take place from Vandenberg, California. Notice of OSCAR II's launch date cannot be given until the parent vehicle is in orbit. As soon as this happens, it will be relayed to radio amateurs throughout the world by W1AW, the Voice of America's Spacewarn broadcasts, and by radio, television and press reports.

OSCAR II tracking and reception observation should be reported to the Project OSCAR Association, P.O. Box 183, Sunnyvale, California, using the standard OSCAR reporting forms (see SPACE COMMUNICATIONS, *CQ*, October, 1961). Copies of this form can be obtained directly from the OSCAR Association.

The OSCAR Association has developed a simplified Doppler shift measuring technique which requires a team of two observers. High gain beams and antenna tracking systems *will not* be necessary for these measurements, and a 3 element beam, or even a ground plane, should be sufficient for tracking OSCAR II, and computing Doppler shift and other orbital parameters. Information on this simplified technique, and OSCAR II tracking reports de-

[*Continued on page 98*]



CONTEST CALENDAR

FRANK ANZALONE, W1WY
14 Sherwood Road, Stamford, Conn.

CALENDAR OF EVENTS

Mar. 31 - Apr. 1	Helvetia 22
April 7- 8	PZK C.W.
April 14-15	REF Phone
April 14-15	PZK Phone
April 14-15	*CQ* WW VHF
April 28-29	PACC C.W.
May 5- 6	PACC Phone
May 5- 6	USSR DX
June 1- 4	CHC/HTH Party

Helvetia 22

Starts: 1500 GMT Saturday, March 31st.
Ends: 1700 GMT Sunday, April 1st.

Because of the Easter week-end and local holidays in Europe, it was found necessary to move up the date of this year's contest.

Rules and awards are same as last year and were reviewed in last month's CALENDAR.

Your logs should be postmarked no later than the 15th of April and go to: The USKA Secretary, HB9NL, Bueron, LU, Switzerland.

PZK

C.W.
Starts: 2000 GMT Saturday, April 7th.
Ends: 2000 GMT Sunday, April 8th.
Phone
Starts: 2000 GMT Saturday, April 14th.
Ends: 2000 GMT Sunday, April 15th.

A new contest planned and sponsored by the P.Z.K. in commemoration of the thousandth anniversary of the Polish state.

It's a world wide type of contest with extra point credit for working SP stations. Rules were in last month's CALENDAR.

The deadline for mailing is July 1st and your logs go to: The P.Z.K. Contest Committee, P.O. Box 320, Warsaw 10, Poland.

REF

Starts: 1400 GMT Saturday, April 14th.
Ends: 2200 GMT Sunday, April 15th.

Above time is the phone week-end only. The c.w. section took place back in February, and rules were in the CALENDAR for that month. Logs go to: R.E.F. Contest Committee, B.P. 42-01, Paris RP, France.

CQ WW VHF

Rule Changes have been made this year. Check page 79 for full info and page 80 for a picture of the certificate that goes to the winners.

PACC

C.W.
Starts: 1200 GMT Saturday, April 28th.
Ends: 2000 GMT Sunday, April 29th.
Phone
Starts: 1200 GMT Saturday, May 5th.
Ends: 2000 GMT Sunday, May 6th.

This is the 7th Annual PACC Contest held by the VERON, in which other countries are invited to work as many PA stations as possible during the contest period.

1. Activity on all bands, 3.5 thru 28 mc.
2. The usual five and six digit serial numbers, RS or RST report plus a progressive QSO number starting with 001.
3. Each QSO counts 3 points, and each station can be worked once on each band.
4. The multiplier is determined by the number of provinces worked on each band.
5. The final score therefore will be the sum of QSO points multiplied by the number of provinces worked on each band.
6. Certificates will be awarded to the highest scorer in each country. In the case of CE, PY, VE/VO, W/K, ZL and ZS, each call area will receive an award.
7. The PA stations will identify their province by two letters after their number. The provinces, eleven in all are:

FR	Friesland	UT	Utrecht
GR	Groningen	LB	Limburg
DR	Drente	NH	Noord-Holland
NB	Noord-Brabant	ZH	Zuid-Holland
OV	Overijssel	ZL	Zeeland
GD	Gelderland		

Contest contacts can also be applied toward the PACC Certificate which requires proof of having worked 100 different PA-stations.

Mail your logs no later than June 15, 1962 to: P.v.d.Berg, Contest Manager, Keizerstraat 54, Gouda, Netherlands.

U.S.S.R. INTERNATIONAL DX CONTEST, MAY 5-6, 1962

Call _____ Name _____

Address _____

Country _____ Transmitter Power Input _____

Antenna _____ Receiver _____

Date	*Band*	*Time (GMT)*	*Station Worked*	*Ser. Nr. Rcvd.*	*Ser. Nr. Sent*	*Points*	*Jury's Notes*
May 5	14 Mc	2108		579002	589001	1	
" "	" "	2110		569005	589002	1	

Number of Points for Contacts _____

Number of Countries _____

Total Number of Points _____

May _____ 1962

(Signature)

_____

Sample Log for U.S.S.R. International DX Contest.

USSR DX

Starts: 2100 GMT Saturday, May 5th.
Ends: 2100 GMT Sunday, May 6th.

Once again the U.S.S.R. Federation of Radio Sports is sponsoring its annual Radio Day DX contest, with its motto, "Peace to the World."

Rules, awards and etc. are the same as last year with one change. Contacts with one's own country are now permitted for country multiplier purposes, providing it's not in the immediate area.

1. This is a c.w. contest only, 3.5 thru 28 mc.
2. The usual six digit serial number starting with 001.
3. Each contact counts one point.
4. The same station can be worked once on each band.
5. Your country total however is the number of different countries worked on all bands. Not the sum total from each band.
6. Therefore your final score will be the total number of contact points from all bands multiplied by the number of different countries worked.

Awards will be made on the basis of all band operation. In addition however, single band awards will be given for 3.5 and 7 mc operation. Awards will be made to both single and multi-operator stations in each country as follows:

1st Place—A 1st degree certificate and a contest badge.
2nd & 3rd Place—A 2nd degree certificate and contest badge.
4th & 5th Place—A 3rd degree certificate and contest badge.

Each operator of a multi-operator station will also receive a badge.

Contacts on contest logs can be credited for the following certificates:

1. W 100 U, for working 100 different Soviet stations.
2. R 6 K, for contacting all six continents.
3. R 150 C, for working 150 different countries.

Your logs should be mailed no later than May 15th to: U.S.S.R. Central Radio Club, Att: Chief Judging Board, P.O. Box 101, Moscow, U.S.S.R.

CHC/HTH

Starts: 2300 GMT Friday, June 1st.
Ends: 0600 GMT Monday, June 4th.

The certificate hunters are going to make this an annual affair and the way their membership is growing this could develop into quite a party. Full details in next month's CALENDAR.

Ed. Note

Altho the returns for the phone contest appear to be below normal the c.w. logs are still pouring in at this writing. This in spite of the lackadaisical attitude of some of the W/K gang. I will never understand how a fellow can put in a week-end of operating and then not bother to send in a report. At least the over-seas entries are still coming thru. The last mail brought over a hundred logs from the USSR alone, and some of them are real toughies, so back to the "salt mines."

73 for now, Frank, W1WY

The USA-CA Program

BY CLIF EVANS*, K6BX

ANNOUNCING fifty-nine USA-CA winners through February 1, 1962, together with assignment of low certificate numbers: As you know, the OLD MAN was waiting for that last slow boat from China so that all DX applicants would have equal opportunity to compete for low number certificates. As we promised, all applications which arrived within a stated 'formula' period would be awarded a *number one series* with equal standing and with a letter designation meaning only that such call was drawn by lot from a hat in indicated order. *CQ* and the OLD MAN'S hearty congratulations to the following USA-CA winners:

USA-CA-1000

1 ..... K4BAI
2 ..... K7NHG
3 ..... K6YMZ

USA-CA-500

1-A	K2PFC†	28	WØARO†
1-B	W8IBX	29	W2FLD
1-C	WØMCX	30	W8CXS
1-D	PJ2AF†	31	K8EUX
1-E	W8NAN†	32	W3DKT
1-F	ZL1TB	33	K4RNS‡
1-G	K6SXA†	34	WØIUB
1-H	K6YMZ	35	W1YPH‡
1-I	VE3BKL†	36	W8BIL†
1-J	W5PSB	37	W8RQ†
1-K	KL7MF	38	W1RWP†
1-L	W4UF/ W4ZKD‡	39	W9GFF
		40	W3BNU
		41	K7AGJ
1-M	TG9AD	42	DL1QT†
1-N	K5DGI	43	W9QGR
1-O	DL9PF	44	W8APN
1-P	SM5WI†	45	W9QWM
1-Q	W8WT	46	W9CMC
1-R	K9EAB	47	KØDEQ
1-S	K1BUR	48	WA2WKU
1-T	W1GKJ	49	W8WUT‡
1-U	W5AWT†	50	KP4CC
1-V	W5NXF†	51	K9QGR‡
1-W	K5UYF	52	KØGIC‡
1-X	W6YC†	53	K8GKF†
1-Y	KH6DKA	54	SM5CCE
1-Z	Andy Rugg§	55	WA6ATY
27	W6PCA†‡	56	K6BX

The OLD MAN, CHC Secretary, is just a bit proud that fifty of fifty nine USA-CA winners were CHCers; that all seven YL winners were CHCers and that all eleven DX winners, representing nine different ARRL countries, were CHCers. CHCers are the world's top performers, so it came as no surprise that they led the USA-CA parade.

Actually we did not draw Andy Rugg's name from a hat, and assigned him number 1-Z just to round out the alphabet. Andy went down on the records as Short Wave Listener, USA-CA winner number ONE. Hamdom's congratulations to you Andy!

Now that we have the above chore behind us, must get busy and start processing certificates proper. We ask patience and, as they say, patience usually is well rewarded . . . well, now, until you see the USA-CA you just can't imagine how really beautiful and colorful it is, besides being the biggest and most symbolicly significant award in the world. Wish the OLD MAN was artistically endowed so he could hand letter names on certs in Old English or something, but, situation being what it is, you'll just have to accept a typewritten job . . . that is, unless you have an artist friend and would like to do that little chore yourself. If so, all one has to do is state such on application and we'll be glad to oblige.

Arne Trossman Top-Honors Plaque—How Born

The two top amateur radio awards in the world are the CHC-200 Top Honors Award and the Arne Trossman Top-Honors Plaque. Because the two awards are intimately related, let's discuss the HOW and the WHY.

The CHC-200 award signifies a holder has won 200 or more amateur achievement awards and/or credits which by their very nature cover practically all of hamdom's diversified fields. As stated in CHC's four "purposes," CHC actively promotes and supports wide participation in all of hamdom's activities and fields. These include, among others, contests; awards hunting; ARRL leadership and station appointments; disaster, emergency and community service; contributions to the art and science; and CHC gives recognition and credits for whatever significant achievement which promotes amateur radio's welfare. Credits are given for improving one's code speed and for attaining higher grades licenses. Credits are given for participation in or joining groups whose sole purpose is achievement, real or symbolic; thus, membership in OTC, OOTC, QCWA, RCC, TOPS, FOC, A-1 Op, FHC and similar clubs constitute a credit toward CHC. CHC gives five bonus credits to any blind or paralized ham in recognition of such achievement under difficult handicap. CHC promotes operation on all bands and by all modes and gives bonus credits to those who diversify their operational achievements. CHC by its very nature therefore is

*United States of America Counties Award Custodian, Box 385, Bonita, California.

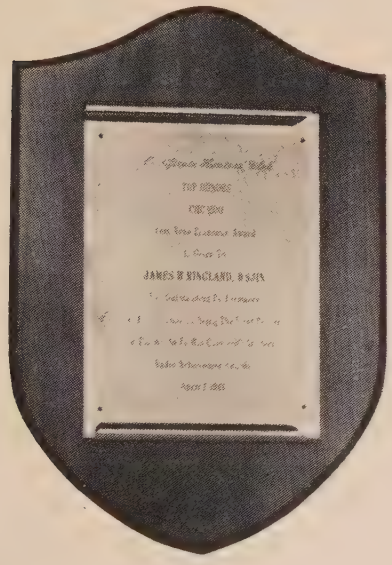
†Applicants given one or more special endorsements for all one band or all one mode of operation. All others are for mixed mode/band operations.

‡YL.

§S.W.L.

"The Award of All Awards." It is not only an achievement to join CHC (minimum 25 achievements required) but it is an honor.

It is one standard of achievement and so-called leadership to be high on some *one* Totem Pole; however, it is quite another to be a leader by excelling in many fields. Unfortunately, those who specialize, too often become overly obsessed and thereby serve only selfish personal hobby interests. On the other hand, folks with broader hobby interests are prone to possess a more healthy outlook and philosophy which integrates family, social and business life and amateur radio into a more balanced perspective. One of CHC's goals is to present a fresh,



Pictured here is the Arne Trossman Top Honors Plaque sponsored by the Editor of CQ and presented to holders of the CHC Top Honors Award who are holders of over two hundred amateur radio achievements and who have contributed in major part to hamdom's news and hamdom's promotion both today and through the years. See text for story.
(Photo by Bill Benesch, K8EQB)

new approach to our hobby which not only provides wholesome opportunity for diversification, but does so with a provoking challenge that greatest achievements come from individual contributions to hamdom's welfare. It is just simply a case of broadening the participation base and recognition that there is greater achievement satisfaction in giving, than it is in just selfishly taking.

The following about Arne Trossman, our 'Boss,' wasn't discussed with him, but it is based on demonstrated facts so we hope he will let us have our little say as the tribute to him is well deserved.

Long before the OLD MAN started 'editorializing' in this USA-CA column, *CQ's* new Editor, Arne Trossman, himself a CHCer, recognized that amateurs who were CHCers and especially those reaching CHC-200 Top Honors were truly among hamdom's most distinguished leaders whose contributions were making a major part of today's amateur history. If there is any doubt on this score, all one has to do is check the CHC membership list, now almost 500 strong, against those persons prominently in the news limelight whatever the hamdom affair.

It is the OLD MAN'S observation (not having discussed the subject with Arne) that *CQ's* new Editor accepted obligation and responsibility that a free-press rag should serve hamdom's overall interests by promoting others as-well-as just *CQ's* programs. It followed then that *CQ's* WPX Award Rules were re-written in such manner that WPX now encompasses all the world's awards, supports them and likewise draws strength from them. Following that came *CQ's* sponsorship of the long needed and awaited USA-CA awards program which encompasses and directly supports all U.S. and related awards. One must admit that this is a most healthy journalistic attitude and approach in the face of 'opposition' economic competition. You can see after reading the four "purposes" of CHC that the OLD MAN had no difficulty dividing his affection between his own awards publications and managing the USA-CA Program for *CQ* because, both seek similar goals and one supports the other and each, all others.

It was in this atmosphere and philosophy that Arne decided the CHC-200 Top Honors Award was truly representative of hamdom top honors and a sound basis upon which to set a fixed ceiling at which all could shoot; hence was born the Arne Trossman Top Honors Plaque. Arne also subscribed to the concept that achievements belong to an individual and not to a call or a QTH; likewise, Arne accepted the philosophy that once a ham had won top honors he was a member of such group with equal standing, rather than subordinated to the other by some date or number.

Arne makes every attempt that Top Honor Plaques are presented at some notable hamdom affair to lend prestige to winners. As example, CHCer Sax, W2SAW, on six week tour of Europe this Spring giving color slide shows, (primarily featuring CHCer activity) will present Harry, SM5WI, with his Plaque in Harry's own radio club in Vasteras, Sweden.

Hamdom leaders who already have won the CHC-200 Top Honors Award and the Arne Trossman Top Honors Plaque are (alphabetically by call and year):

1961	1962 (to date)
SM5WI, Harry Akesson	W5AWT, Mel Boatman
UR2BU, Karl Kallemaa	W4HYW, Tom Moss
W2QHH, H. S. Bradley	W8PQQ, Albert Hix
W6KG, Lloyd Colvin	K9EAB, Cliff Corne
W8AJW, Jack Siringer	
W8JIN, James Ringland	
W8WT, Lester Jeffrey	

Jim Ringland, W8JIN, Cincinnati, Ohio, sitting at the console of his all band/all mode station which blankets the world with his well known call. Jim was first ham in world to achieve over 200 awards and to win both the CHC-200 Top Honors Award and the Arne Trossman Top Honors Plaque for his major contributions to the art and science. Presentation was made at the 1961 Dayton Convention. See text story about ten other hamdom leaders who followed Jim into the Top Honors fraternity the gateway to which is participation in a variety of hamdom's diversified fields in which achievement is attainable.

Virginia Announces County Award

Last minute word received from Steve, K4WVT that the Roanoke Valley Amateur Radio Club, will sponsor an award for working Virginia counties. Award will be in several classes. Exact details now being formulated and will be carried in this column later. For advance info on this award, to be named the Old Dominion Award, send s.a.s.e. to Steve, 1802 Bridle Lane, S.W., Roanoke, Va.

South Dakota Breaks Awards Deadlock

South Dakota has always been a difficult state to work even for WAS. The *Directory of Certificates and Awards* published by your scribe doesn't list a single award sponsored from South Dakota, nor is South Dakota represented on CHC's hunter list. All that is past history. South Dakota hams have awakened to the fact that they have been missing out on a lot of free publicity which could enhance both them and their state.

Today, as we send off our copy to *CQ*, received telegram from Girdon, KØYVC, that the Sioux Falls Amateur Radio Club has a South Dakota award in the mill for working South Dakota counties and is joining the USA-CA Program. Tentative plans are to picture the U.S. national "Shrine of Democracy," Mount Rushmore, Black Hills, S.D., on the certificate proper. Details are being worked out. We will carry final awards info in a later column. If you just can't wait, write Gordon, Box 91, Sioux Falls, S.D.

Of immediate interest on South Dakota activities, the Huron Amateur Radio Club has announced a South Dakota Field Day commencing 8 A.M. April 20th and lasting to midnight April 21st, CST. Operations will be from a special mobile trailer located at the South Dakota State Fair Grounds with call, WØQDN/Ø. Multi-band operations are scheduled on 3695, 7145, 7225, 14,075, 14,260 and if band opens, on 27.800 kc.

While the S.D. QSO Party is primarily to help others work the state for WAS, it is expected that many S.D. hams will turn out giving contacts for various "rare" counties. Send S.D. QSO Party, WØQDN/Ø, QSLs to HARC, c/o President, KØTKN, Vincent A. Van Der Hyde, 747 14th Street, Huron, S.D.

South Carolina Joins the USA-CA Program

South Carolina, heretofore without awards representing the "Palmetto" state, announced a worked South Carolina counties awards program sponsored by the Greer Amateur Radio Club, K4VYF, adding to the long list of states now represented in the mammoth USA-CA Program.

The award is in process of design and full details will be carried in this column at a later date. Eager Beavers can get advance info by sending s.a.s.e. to the club, c/o Joe Forrester, K4SFW, Route #3, Greer, S.C.

Hamdom's Awakening to Hunting Pleasures

All the foregoing is but an illustration of some of the new programs both *CQ* and CHC have brought to hamdom in the field of awards hunting and with broader achievement significance in all fields. There is, today, actual evidence that thousands of amateurs and even s.w.l.s the world over have awakened to the deeply satisfying fun to be found in awards hunting and other related 'achievements.' Likewise, there has come an understanding that *CQ*'s WPX and USA-CA programs are so encompassing that by using them as a basis of the hunt, one can systematically achieve many other awards in the process.

There also is factual evidence, today, that thousands have been inspired to achievements in order to become affiliated with CHC with its honors and prestige. CHC now has four affiliated Chapters and many others are in formation. Chapter #1 is in Albuquerque, N.M. Chapter #2 is in South Africa. The *Monitor* staff has CHC Chapter #3. As this is being written, over twenty YL CHCers have formed YL Chapter #4.

Hunt the Hunters Award

The CHC has its own Hunt The Hunters, HTH, awards program for contacting CHCers. Classes of the award are issued for working CHCers in all continents, CHC-WAC; for working CHCers in all States, CHC-WAS; and other varieties of WAZ-DXCC combinations. The certificate (see picture) is 11 × 14″ and comes in four colors. CHC/HTH facilitates achieving many other awards, because first, CHCers are the most active of all amateurs and secondly, they are 100% QSLers upon receipt of a card. Another class of HTH is that of working twenty-five or more CHCers who are also members of the Quarter Century Wireless As-

Hunt The Hunters, HTH-200C Award number one won by K2UKQ, Kay Gaynor, for confirmed contact with 200 CHCers. Class B is for 300 CHC contacts and class A is for 400. Beautiful plaques go to those making contact with 500 CHCers. CHC now has close to 500 members representing sixty-three DXCC countries and 54 States and is growing at a rate of over one new member each day

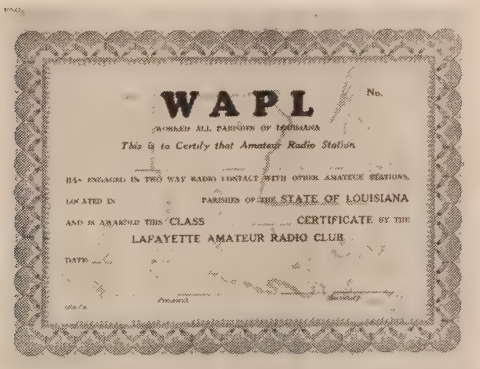
sociation (QCWA). You'd be surprised how many 'Old Goat' CHCers there are and how active they are on the bands.

Every Sunday at 2200 GMT, 14075, the OLD MAN holds forth with a roundtable news sked which always includes giving list of new CHCers and also new members of the Flying Ham's Club, FHC. Thousands of amateurs now monitor this sked for latest awards news, and to work the scores of CHCers to be found around the frequency, plus or minus 5 kc, for several hours before and after sked time. As you know, magazines require a sixty-day deadline time so the CHC news sked often can break the news of even current affairs.

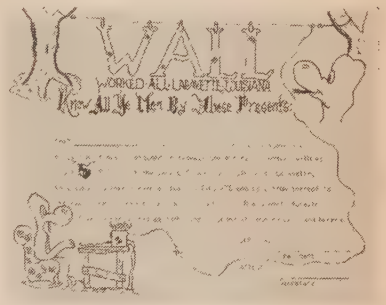
Work All Louisiana Parishes

Eureka! Last issue we made a 'born' wish our 'home' state of Louisiana would come up with an all county award . . . 'cept down there they call them Parishes . . . and by Jupiter, the OLD Man's 'kin folks' did him proud. The Lafayette Amateur Radio Club is sponsoring three classes of a "Worked All Parishes Award," WALP, with class A for all 64 Parishes, class B for 32 and class C for 16. Special endorsements will be made for all one-band or all one-mode operations. Naturally they accept the *Directory's* GCR certification system (two other licensed amateurs or a radio club official certify that QSLs were sighted). Send GCR list and 50¢ to Custodian, K5VDF, John Phillips, 200 Dean Street, Lafayette, La.

John tells me that the club will run DX-Ps into rare Louisiana Parishes and such will be announced from time to time. Thanks John, and should you ever be Sunday driving along a certain oyster shell road nearby and pass a sign saying "Archibald," that's where the OLD MAN was born this month of April some . . . years ago.



Down in the state of Louisiana they don't have counties but that didn't keep them from joining the USA-CA Program; down there they call them Parishes. Pictured here is the WAPL, newly sponsored award by the Lafayette Amateur Radio Club, details of which are carried in the USA-CA column. See text for story.



Pictured above is the Worked All Lafayette Louisiana Award (WALL) given by the Lafayette Amateur Radio Club for working five members. The certificate purposely was designed for wallpaper and although the picture does not bring out details, is actually a piece of regular wallpaper with a silver-white pattern like you'd expect to find in Grandma's dining room. The Lafayette club now sponsors the Work All Parishes Louisiana award (WAPL) story of which is in the text.

The club also issues the Worked All Lafayette Louisiana, WALL, certificate for working five members of club. See pictures shown of both WAPL and WALL certificates.

Novice Wins CHC Honors

CHCer number 436 was none other than KN8YBU, Ross Kirk, of West Virginia who was first in world to qualify for twenty-five amateur radio achievements during his year as a Novice. Just goes to show that 'hunting' belongs to all of us and the 'men' had better look toward their laurels. All Hamdom's congratulations to you Ross and may the future convince additional Novices that awards are for them as-well-as Old Timers.

The DX Ham's QSL Problem

DXers have shown considerable interest in the USA-CA and, along with it, increased interest in all other U.S. awards. Fact is, USA-

This beautiful Certificate Hunters' Club, CHC-200 Top Honors award #1 was won by Jim Ringland, W8JIN, first ham in world to hold over 200 amateur achievement awards. See feature story in May, 1961 CQ. Today, a total of eleven amateurs hold the CHC-200 award and also have received the Arne Trossman Top Honors Plaque in recognition of their major contributions to hamdom's history. See text for this story. The CHC was founded by Clif Evans, K6BX, Publisher of the *Directory of Certificates and Awards.*

CA has many DXers pointing their beams toward the U.S. whereas before they favored other directions . . . we've actually created a situation with USA-CA where all U.S. hams are now being sought after and 'rare' county hams now experience pileups. Who would have thought to see THAT day?

A flood of DXer mail tells us, however, that a high percentage of U.S. amateurs do not give courtesy of naming county on QSLs. This is ironic and a reflection on our past 'leadership' because, for many years, half of U.S. states had all county awards and there have been scores of U.S. awards based on a county identity concept. Let's face it, our 'leaders' were too busy promoting their own 'babies' and the status of education of U.S. hams to truths of the QSL situation were 'lost' in the shuffle. But that is the past . . . the 'word' is now being spread about basic QSLing courtesies and in a not too distant future this lament of our DX friends should be past history.

The question of naming counties on QSL cards has always been highly important to most DXers because nearly all major countries have awards for working their similar Geo-political sub-divisions. Germany has its DOKs, Sweden its Laans, France its Prefectures, Russia its Oblasts, and so on . . .

To check DXer point of view we just broke out the first fifty DL/DJ/DM QSLs not including DL4/5 GI cards . . . result, 100% of the cards named DOKs. Next check we broke out the first fifty QSLs received from New York which for ages has had an all county award . . . result, only eighteen of fifty cards named counties. Now gang, you will have to admit with me this is a sad sack situation which all of us should work on, through our clubs . . . over the air and whatever, to convince all U.S. amateurs that naming of counties is a basic courtesy we owe other hams and especially DXers.

In the interim, the OLD MAN herewith and forthwith creates and puts into operation, the USA-CA Good Will Club with purpose that any DXer may feel free to write directly to any member seeking information about identity of U.S. counties denied them by thoughtless folks . . . agreed . . . 'tis done . . . now all we need are volunteer members of the USA-CA Good Will Club, so send in your names and we'll get this 'parade' on the road. Don't worry, we'll get the 'word' on members to our DX friends.

OLD MAN'S Free Poop Sheets

Back when we were in the Navy, as we always said, no matter how many times the word was passed, there always was one swab that didn't get the 'word,' so to keep it to the 'one' level with this 'show,' the OLD MAN prints up a batch of poop sheets that are treasures within themselves. Right now we have separate sheets for: 1. USA-CA new March rules with application and certification forms; 2. CHC and HTH Award rules with latest April CHC membership list in alphabetical order; 3. QCWA award rules with latest (3000) membership list alphabetically for quick reference; 4. FHC award rules and latest April membership list; 5. WPX/WAZ latest revised rules; Flyers covering K6BX published *Directory of Certificates and Awards,* and the *DX-QSL-News Letter.* Any or all are yours for the asking and s.a.s.e.

Okey Mates, we've passed the word for this session, and like the man said and you see, the USA-CA is not just an award as such but is a tremendous and exciting program with new and challenging frontiers (stole that one from JFK). You, not we, generate the high interest news so put on the think cap and see what startling thing you can come up with. Also, you blokes in unrepresented USA-CA states . . . let's kindle a fire under the right folks thereabouts. Just so long as you keep telling our 'Boss' man in New York you are interested in the 'hunt,' we'll always be around for a next issue . . . until then, Happy Hunting.

The OLD MAN, K6BX

S-2361

Senate Bill S-2361 is still pending before the Senate Committee on Interstate and Foreign Commerce. No date has yet been scheduled for its hearing. The Bill cannot be moved to the Senate and the House for a vote until it clears the Committee. Without Senator Schoeppel's support (the late Senator was a member of the Committee), it is very possible that the Bill may die in Committee. Now, more than ever before, it is important that radio amateurs throughout the country write or wire Senator Warren G. Magnuson, Chairman of the Committee, and their Congressmen, in support of the Bill.

The CQ World-Wide V. H. F. Contest

APRIL, 14-15

RULES for the *CQ* World-Wide V.H.F. Contest have been slightly changed this year to promote rapid logging and expedite both phone and c.w. exchanges. The contest period has been lengthened to 34 hours providing an opportunity to operate during all existing band conditions. Power multipliers have been eliminated.

Remember this is a world-wide contest. DX stations are encouraged to submit logs using their geopolitical equivalent of our counties.

Operators in each State compete against each other in *one* of four (4) separate categories outlined below.

On phone, call "CQ Contest" and c.w., call "CQ TEST."

Carefully check the sample log shown here and the following rules. Logs must be postmarked no later than May 1st, 1962 to be eligible for awards.

Rules

A) Band: All amateur bands 50 mc and above will be used for this contest. A station may be worked only *once* on each band.

B) Time: Contest *starts* at 12 noon, local standard time, Saturday, April 14, 1962 and *ends* at 10 P.M. local standard time, Sunday, April 15, 1962.

C) Categories: Four major divisions of this contest are included. Contestants are permitted to enter only one of these divisions. They are as follows:

1—Single Operator—Single Band.
2—Multi Operator—Single Band.
3—Single Operator—Multi Band.
4—Multi Operator—Multi Band.

D) Multipliers: A multiplier of one (1) will be awarded for each new county worked on each band.

A multiplier of one (1) will be awarded for each hour of operation during the contest period in which at least three (3) contacts have been logged. The total number of hour multipliers is not to exceed twenty-four (24).

E) Exchange: Information exchanged during the contest period shall include the following: 1-Station, 2-County and State, 3-Serial Number. The serial number on each band shall consist of the signal report, followed by a three digit contact number beginning 001. Not starting with 001 will result in disqualification. *Example:* c.w.-579001, phone-58001.

F) Scoring: Each new station counts one (1) point. One-way QSOs do *not* count. Total score will be computed as follows: Number of contacts × number of different counties worked × hour multiplier.

Example:

100 Contacts
× 20 Counties
2000
× 10 Hours
20,000 Total Score

Multi-band entries will compute their score by *adding* the individual score computed for each band.

G) Logs: A sample log is included here for your inspection. Blank log sheets are available from *CQ* V.H.F. Contest Committee and an s.a.s.e. will expedite their delivery. Logs should be postmarked no later than May 1, 1962 to be eligible for awards. All logs received after this date will be used for checking purposes. Results of this contest will be published in *CQ*.

H) Awards: Operators compete in state and categories outlined in paragraph C above. Certificates will be awarded to the highest scoring station in each state in which three or more logs are received. Certificates will also be issued to stations outside the United States under the same conditions.

Handsome plaques will be awarded all stations scoring in excess of one-million points—multi-band, 500,000 points—single-band. ■

CQ WORLD-WIDE V.H.F. CONTEST

Call W6TNS

Log For 50 Mc Band

(Use separate log for each band.) Number of Operators ONE (1)

DATE / TIME	STATION	COUNTY & STATE	SERIAL Sent	SERIAL Received	NUMBER Received	MULT.
4-13 1200	K6LKV	VENTURA - CALIF	58001	58001	1	1
1202	W6YKS	SANTA CLARA "	57002	57001	1	1
1204	WA6NIJ	SAN DIEGO "	57003	57003	1	1
1210	K6YJG	ARAPAHOE COLO	58004	58002		
1215	W7AAU	MULTNOMAH ORE	58005	58006	1	1
1215	WA6BCN	SANTA CLARA CALIF	58006	58005	—	
1222	WA6LEE	SOLANO "	57007	57007	1	1

CQ Form 1052 eff. April, 1962.

Sample log sheet

CQ WORLD-WIDE V.H.F. CONTEST

☒ Multi-Band Entry ☒ Single-Operator Entry Station Call W6TNS

☐ Single-Band Entry ☐ Multi-Operator Entry Number of Operators ONE (1)

Band	QSOs		County Multiplier		Hour Multiplier		Final Score	
50 Mc	61	X	14	X	12	=	10,248	50 Mc
144 Mc	38	X	7	X	4	=	1,064	144 Mc
220 Mc	17	X	3	X	5	=	255	220 Mc
432 Mc	—	X	—	X	—	=		432 Mc
1296 Mc	—	X	—	X	—	=		1296 Mc
Other ( )	—	X	—	X	—	=		Other ( )
							11,567	Multi Band

DISTRUCTIONS To determine Multi-Band score, add the final score computed on each band and insert it in box marked "Multi-Band."

Transmitter Description and Power 6AG7 - 6763 - 6360 - 4X150A 200 WATTS

Receiver HOME-BREW NITA CONV. TSA-3

Antennas 50Mc - 6 EL WIDE-SPACED YAGI, 144Mc & 220Mc 14EL YAGIS

Other Operating Aids

Remarks (Suggestions, Criticisms, Comments)

Club Participation

This is to certify that in this contest I have operated my transmitter within the limitations of my license and observed fully the rules and regulations of the contest.

Name Call

Street and Number

City Country

Submit logs to: CQ, 1841 West 43rd St., New York 36, N.Y. Att: VHF Contest Committee

CQ Form 1053 eff. April, 1962.

Sample cover sheet

VHF

50mc. 144mc. 220mc. 420mc. and above

DONALD L. STONER, W6TNS
P.O. BOX 137, ONTARIO, CALIF.

On the subject of awards, contests and certificates, I must apologize for the colossal snafu which has occurred as a result of editorial transition of the VHF COLUMN. I can only say to be patient, for it is an enormous job to pick up the pieces. By the time you read this, the machinery should be well oiled and functioning smoothly.

The purpose of the VHF Century Club award, which has caused most of the problems, is to promote interest and activity in the v.h.f. regions. It is given to anyone who can accomplish the following within any 365 day period:

1. Six meter applicants must show a list of 150 contacts which have been verified by local examination of the same number of QSL cards. Each applicant must list the call of 150 different stations and the date worked. They should be numbered from one to 150 (in chronological order) and the two dates furthest apart must not exceed one year. Each list is to be headed by these two dates showing the span of time covered in the application. Each list must be accompanied by a statement reading, "We the undersigned hereby verify that Sam Ham, K5XXX, displays the cards listed from actual on-the-air contacts." This statement must be signed by at least two licensed amateurs who would be familiar with QSL formats. Every tenth applicant will be requested to send his cards (along with sufficient return postage) as a spot check.

2. Because of the more limited range of 144 mc, two meter applicants need submit a list of only 100 confirmed contacts with the same additional information as under number 1.

3. For the same reason, 220 mc applicants need submit a list of only 50 confirmed contacts with the same additional information as required under number 1.

4. Applicants for a 432 mc certificate must show a list of only 25 confirmed contacts with the same additional information as under number 1.

5. There is no limit as to the number of certificates you may earn. They will be dated according to the dates you present on your list so that you can take off on a new award from the date appearing on the last. There is no charge for the certificate. This is another service of *CQ* to promote amateur activity.

6. If the applications are properly submitted you should have the certificate back within 30 days.

CQ's V.H.F. Contest Award Certificate.

VHF Contest

The *CQ* World Wide VHF Contest has been re-scheduled to the weekend of April 14-15 to avoid the conflict with Easter vacation. Let's have a big turnout for this one. It will be my first v.h.f. contest and I am looking forward to getting into the fray. The award certificate is a beaut, repleat with a gold seal! Awards will be made to the highest scoring stations on each individual v.h.f. band in every state, province and foreign country from which at least three logs are received. A special gold plaque will be awarded to stations submitting scores in excess of 500,000 points, single band and one-million points multi-band. See the rules printed in this issue for more complete information.

VHF Around The World

Six meter activity in Australia is growing by leaps and bounds. Many of the Division stations (like our W1AW) have added six meters to their weekly amateur news broadcasts. DX'ing has become popular sport with occasional openings between Victoria and Queensland. Ian, VK3ALZ has erected a 30 ft long yagi for six and intends to be right among the DX this season. George, 3ZCG and 4ZAZ are running tropo skeds between 1945 and 2345 nightly. Two meter activity is also high. Dane, 4ZAX in Queensland, now has an excellent antenna system for this band, consisting of four

yagis of 14 elements each at a height of 80 ft. He has been hearing signals on a frequency of 144.0025 via meteor trail reflection and shortly will be connecting up a parametric r.f. stage. VK7ZAI is also working on a parametric amplifier and, in conjunction with 7BZE, is experimenting with passive repeaters.

V.h.f. in the Soviet Union? There certainly is a tremendous amount of activity. Fox hunts are extremely popular as they are all over Europe. The equipment, however, appears to be five to ten years behind development here. Superregen receivers and modulated oscillators on 144 seem to be most popular and very few crystal controlled units have been described in *Radio* magazine. However every issue does have something in the way of equipment, indicating a high amount of interest. If you would like to see some of their circuits and projects, drop me a line and we'll devote some space to it.

The High Nets

The North Georgia Graveyard Net meets every Thursday and Friday night at 2200 EST on 50.25 mc. K4UQM is net control. Certificates will be awarded by the San Diego, California net to all hams checking in for at least one-half hour on each of three consecutive net nights. Thanks to Bill Jones, K4UQM for this information.

The Single Sideband Net meets at 50.105 mc every Sunday at 1:00 P.M., EST, with a rotating net control. The general coordinator is Sam, WA2CVF and on an average Sunday they get between 8 and 20 sideband stations signing into the net. Most members of this net will be meeting at a special table set aside for them at the New Jersey V.H.F. Association dinner on February 24.

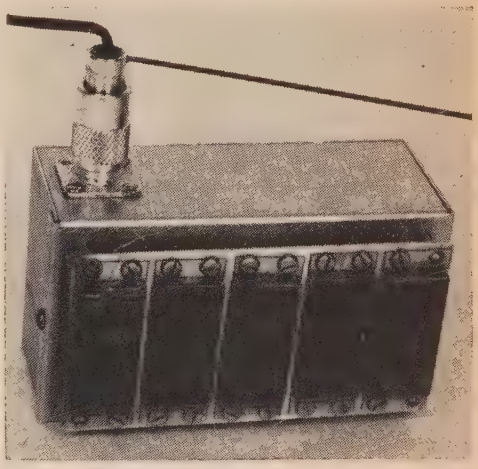
Let's Get Technical

Some months ago I mentioned a QRP two meter transmitter which has been operated at Running Springs, Calif. as part of QRP tests in connection with Project OSCAR. Possibly you might like to see it. The rig is shown in the accompanying photographs.

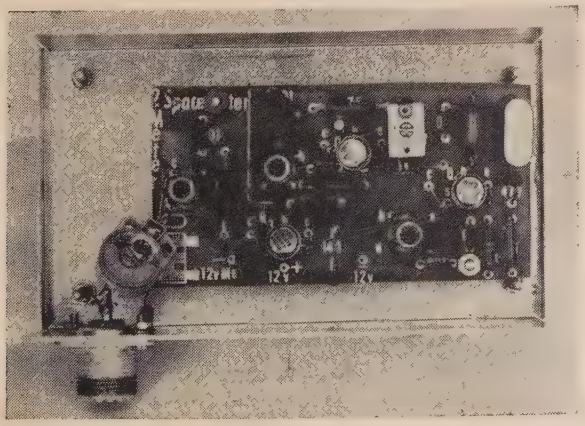
The unit was installed atop a 70 ft tower at my mountain QTH some 6400 ft above sea level. The box containing the transmitter also mounted five shingles of International Rectifier S1M silicon solar cells.

This supplied approximately 12 volts to the transmitter in bright sunlight. A dipole antenna, made from a male coaxial connector and piano wire was secured to the side of the case. The transmitter circuit is identical to the one described in the January 1961 *CQ*, SEMICONDUCTOR COLUMN, and, in fact, is the same circuit board. The transistors have been obsoleted by the Philco MADT 2N1745, the new JEDEC number for the T-series types.

Even with 20 milliwatts output, it was possible to receive the signal from this QRP rig all over Southern California and as far north as Bakersfield. The coverage extended from Santa Monica to Palm Springs and south to the Mexican border. It certainly proves that power is not required to "get out." Of course, OSCAR also proved this point. It is estimated that when it expired, the power level had dropped to one milliwatt, or less.



Front view of the QRP transmitter showing the solar cell shingles. The dipole antenna was mounted directly on the case.



Circuit board for the solar powered two meter transmitter. The circuit was described in the January 1961 issue of CQ in the Semiconductor Column

Parametric Multipliers

There has been considerable amount of interest in parametric multiplication in commercial equipment, but very little seems to be going on in amateur circles.

The parametric multiplication technique employs the reactive characteristics of the silicon diode to generate harmonically related outputs from the driven circuitry. For a practical example, it is possible to use a parametric diode tripler on the tail end of a Gonset Communicator to operate in the 432 mc band. The diode will not cost much more than the price of a 6360 and yet will produce approximately 70 percent of the drive power. Thus, if your rig puts out 10 watts, you can come up with 7 watts or so on 432!

Here's the kicker! You do not require an additional modulator or any accessory circuitry, other than the few parts associated with the multiplier. Luettgenau[1] has shown the very linear input-output relationships of the diode multiplier. In other words, the output sidebands are identical to the input. Because the multiplier is reactive, and has no relationship to class C frequency multiplication, it could be used to faithfully reproduce single sideband on harmonically related frequencies. Because of the linear characteristics of the diode, the unwanted sideband would not be "re-inserted". I can't think of an easier way to get on 432 sideband!

If you would like to try your hand at parametric multiplication, you might experiment with the circuit shown in fig. 1. It requires no idler traps or difficult circuitry to align. The

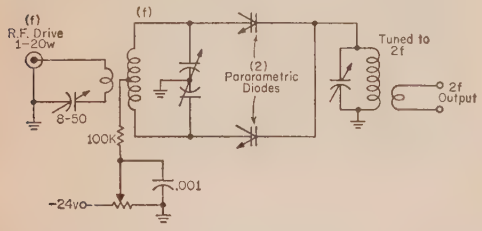


Fig. 1—A simple parametric multiplier suitable for doubling from 220 mc to 440 mc. No coil data is given since tuned circuits may be easily calculated by conventional means. Parametric diodes CR_1 and CR_2 should be similar to PSI "Varicaps."

input circuit is tuned to the driving frequency and resonated with a butterfly capacitor to produce out-of-phase signals. The output of the diodes is combined in a tank tuned to the second harmonic frequency. The diodes should be "cultured" to exhibit the parametric effect and should be similar to the Pacific Semiconductor High Q "Varicaps."

A couple of precautions are in order, however. First, most of the v.h.f. bands are not harmonically (second harmonic, that is) related. Be very careful that radiation on 100, 288 or 864 mc does not cause interference. An output of 440 mc, with 220 mc drive, would probably be the best for experiments. The other precaution is to always operate the diode into a good non-reactive load. The diode can destroy itself with nowhere to dump the harmonic energy.

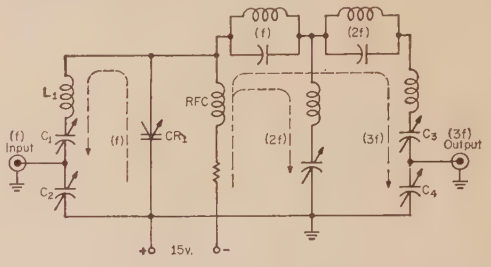


Fig. 2—Pacific Semiconductor's Parametric tripler. Again no coil data is given.

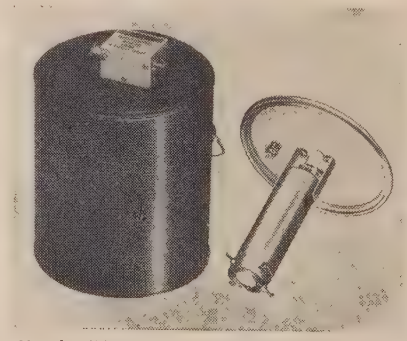
Fig. 2 shows the PSI recommended circuit for a parametric tripler. A bibliography of articles related to parametric multiplication is given at the end of the column.

A New-Vistor

A new double-ended high-mu Nuvistor triode, designed for use in cathode-drive amplifier service at frequencies up to 1200 mc, has been announced recently by RCA.

Designated RCA-8058, the tube is the seventh commercial member in this growing family of thimble-size tubes. It features low noise, excellent stability as an oscillator, high transconductance and high g_m to I_p ratio, typically 12400 micromhos at 10 ma, with 110 volts on the plate. The double-ended construction provides excellent isolation, also.

Speaking of dummy loads, as we were earlier, the Heath Company has introduced their "Cantenna," a resistive load which will handle up to 1 kw, but more important, has less than a 1.5 to 1 v.s.w.r. at 300 mc. The load impedance is 50 ohms and the device has provision for a relative reading diode voltmeter connection. The temperature-stable resistive element is oil-cooled (oil is not furnished with kit) and



The Heath "Cantenna" Transmitter Dummy Load, Model HN-31.

[1]Leuttgenau Williams and Miyahira, *A Practical Approach to the Design of Parametric Frequency Multipliers*, Pacific Semiconductors, 12955 Chadron Ave., Hawthorne, California.

mounts in a 9" × 7" can. The kit, HN-31, is priced at $9.95.

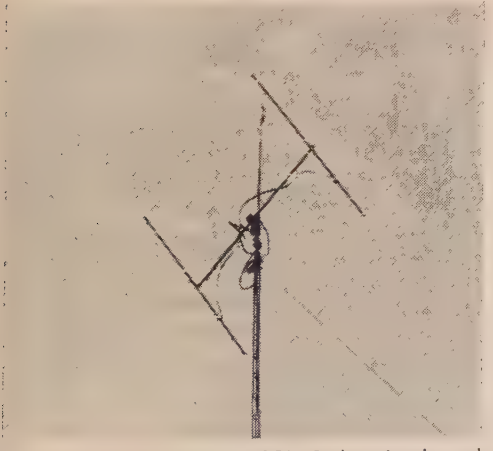
If you are interested in parabolic antennas, be sure to request a copy of Mark Products Company (5439 West. Fargo Ave., Skokie, Ill.) bulletin 620. They have an interesting line, including an "Isopolarizer" which permits continuously variable polarization adjustment of radiated energy.

The Government Printing Office (Washington 25, D.C.) has two new books that should be of interest to v.h.f. enthusiasts. Catalog No. C 13.11:70, titled "Tabulation of Data on Microwave Tubes" provides characteristics and several tabulations based on kind, frequency and power. The price is $1.00. Publication no. C 13.44:33 is titled "An Experimental Study of Phase Variations in Line-of-Sight Microwave Transmissions" and describes the results of experiments in Hawaii on 9,414 mc. The price is 55 cents.

VHF Man of the Month

One of the outstanding hams it is my pleasure to know is Lance Ginner, K6GSJ. Lance typifies my idea of the v.h.f. addict. His station is organized for maximum performance and it is obvious from examining his gear that he believes "any job worth doing, is worth doing well." Although Lance has a parametric converter he uses a 6CW4-6AM4 Heath converter 99.9% of the time.

The superb station of Lance Ginner, K6GSJ. See text for the description.



The antenna system at K6GSJ. Both azimuth and elevation are controlled and have a resolution of better than 5°.

Let's take a trip around his shack via the photographs. Behind the microphone is a Nems Clark receiver used for general coverage. Above that is a control panel for the solid state antenna switching system employing 14 diodes in a four d.p.d.t. latching relay matrix. The long tube above the control panel is the pump oscillator for the paramp, the latter uses a MA450C in a gold lined cavity. A panadapter and liberal sprinkling of Heath gear complete the shack.

The antenna at K6GST is fabulous. Mounted on the 71 ft crankup tower is a 20 ft extension with a J-antenna for local coverage. The tower is also crowned with a pair of 18 element Finco 2 and 6 meter beams which will rotate individually or simultaneously a full 360° in azimuth and elevation. Azimuth can be read to 2°, elevation to 5°.

It goes without saying that Lance was an active participant in the recent OSCAR activities. He was also responsible for many of the tests carried out in pre-launch days.

Letters

Fred Gunnesch, K6YWE, 1885 E. Bayshore Rd., Palo Alto, is getting the v.h.f. bug and would like to do some DX'ing on 420 and 1296. He has acquired a pair of 416's and 7486's and would like to put them to work on these bands. He would like help getting started in the right direction. Fred also has a 4CX300A and socket for trading stock toward 420 and 1296 gear.

William Wells, WA6LKD, 620 E. Oldfield, Lancaster, Calif. wants to see more articles on two meters. He is concerned about the lack of modulation on most commercial and homebrew rigs. "It seems to me that a lot of amateurs in the Los Angeles area who have real strong signals just don't make the grade audiowise. This problem becomes real noticeable here in the Antelope Valley. One out of 5 stations I work would be Q5 with more audio.

More problems—O. S. Robinson, Sr., 1235 E. Anderson St., La Marque, Texas, has an ARR-1 converter and would like to convert it to two meters. Can anyone help him. The tuning of the ARC-5 is covered in the *Surplus Conversion Handbook* by Editors and Engineers.

Wm. Henzly, W3CAV, 29 Wine St., Uniontown, Pa., would like information on building a cavity filter for six meters.

Here's a good idea! Harry Blomquist, K6JSS, 12430 Ted Avenue, Saratoga, Calif. has organized the QRP Club. It is free to anyone running 100 watts or less of power and Harry issues a real fancy certificate. The club is divided into power groups down to 10 watts. He also publishes the *QRP News*, available to

[*Continued on page 100*]

ham clinic

CHARLES J. SCHAUERS, W4VZO
c/o CQ, 300 WEST 43rd ST.,
NEW YORK 36, N. Y.

Most hamshack junk boxes contain one or more relays acquired from various sources over the years. Some of these relays were obtained from surplus electronic outlets at real bargain prices and can be used in many ham radio applications without special effort. On the other hand, many of these relays require odd voltages and currents for operation for which the ham has no supply source. What comes to mind are the relays requiring 24, 28 and 110 volts d.c. or relays requiring a.c. voltages at high frequencies, especially 400 cycles.

From many of the letters received by HAM CLINIC it is apparent that many hams *do not* realize that in order to use a relay properly it must be designed for the desired application and proper voltages fed to it. It is true that many d.c. relays requiring the higher voltages will "operate" on much lower voltages, and in many instances can be modified without too much trouble to fit the ham designer's needs. However, the ham must know a little about relay design and the most effective ways to power and use them.

Relay Types

Relays can be very simple or very complicated, depending on the roles they must fill in the switching scheme. Basically, a relay is nothing more than an electrically operated switch.

The simple relay consists of a coil, armature and contact points. Adjustment for armature spacing may be affected by using screws or springs.

Complicated relays take many forms; the most complex being found in telephone and teletype equipment. However, few hams use "stepping" type relays, the kind which enables multi-point circuit selection in a given sequential order.

What makes relays complicated is *not* the actuating mechanism but rather the configuration and number of contacts which must be closed and/or opened when voltage is applied to the coil which actuates the armature(s).

Relays are manufactured today which require only a few milliamperes for operation, these are the relays which are usually tied to a tube or transistor output circuit as shown in figure 1. Generally, the contact points on this relay will either actuate another relay whose contact points are capable of handling very high currents or operate devices such as lights, buzzers, small horns or similar low current devices.

Today relays are available which will handle radio frequency current switching at very low loss, these are the vacuum coaxial or straight coaxial types such as are manufactured by Jennings Radio, Eimac, Dow-key, etc.

Overload, time-delay, keying, starting, transfer, teletype (polar), phasing, cut-over, antenna, horn, regulator and many other types of relays which have been designed for specific applications are available. These relays take different mechanical and electrical forms, but operate on the same basic principle.

The overload relays is as the name implies, a relay that opens a powered circuit when that circuit draws more current than for which it is designed or set. These are used in transmitters, generators and critical supply circuits. Allied with a temperature sensitive relay, their main role is protection.

Time-delay relays are used when a certain switching sequence must take place. For example, these relays are used for delaying the application of high plate voltage to transmitter circuits until after the filaments of all tubes are hot. Where real high voltages are applied prior to tube heating, tube damage can result.

All hams know what a keying relay is (we hope). This is the relay used for keying a c.w. transmitter. It is installed in keying circuits in various ways and will usually have extra contacts to provide for break-in operation.

Starting relays are relays designed to handle high initial starting currents such as those needed to turn over an auto engine. They also can be found in power generator circuits as well as a.c.-d.c. motor circuits.

Transfer relays are used to "pick up" a low or high current load without circuit interruption. These relays can be quite complicated and are seldom found in surplus electronic-radio gear.

Special purpose teletype relays such as the

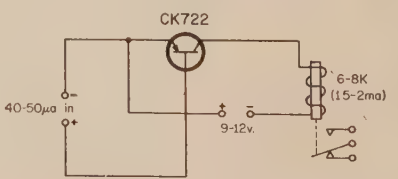


Fig. 1—Typical circuit for low current actuated relay. Around 50 microamperes will cause the relay to operate.

Western Electric type 215 and 255 (polar type) are used between teletype machines (via land-line) for printer magnet (a *type* of relay incidentally) operation. Some teletype hams use a polar relay in the terminal unit to repeat mark-space impulses to the printer magnets. These relays require very careful adjustment and maintenance. For more information on care and adjustment of polar relays, read the fine article by my friend W6VVF in the June 1961 *CQ*, page 38.

Phasing relays are special units which are sometimes used to provide synchronous operation between like power generator units. They are also used (in tandem) for selective circuit phasing in complicated industrial electric applications, *i.e.*, swinging from single to three phase operation of certain types of equipment.

Cut-over relays are similar to the transfer type relays but are designed to handle higher currents.

Antenna relays, of course, are used to switch an antenna between receiver and transmitter. These are designed to handle r.f. and will usually have extra contacts for receiver muting, monitoring, etc. Generally, this relay is a double-pole double-throw type of relay. It comes in many forms, but in its best form is either of the vacuum or coaxial type.

The horn relay is found on one's automobile to actuate the horn, and the reason it is used is because a horn more often than not requires heavy current (at 6 or 12 volts). In order to keep the horn button contacts in good shape (which they would not be if heavy arcing occurred), the relay is used. This, incidentally, is a very simple relay, and can be used by hams in a number of mobile applications.

The voltage regulator in your car is a relay and so is your current cutout. Used together, these prevent overcharging of the car battery and prevent it from discharging into the generator; and determine the current and voltage applied to the car battery at various generator speeds.

There are many other types of relays used throughout the radio-electronics world which are known generally by the name of their application.

Now that transistors have come into the fore and are being used as relays for switching applications without attendant mechanical maintenance worries, there are a number of areas in the ham radio design field in which they can be used with great success. Figure 2 shows how a transistor is used as a switch.

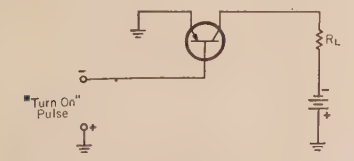


Fig. 2—A negative pulse applied to the base will cause current to flow in the collector circuit through R_L; removal of the pulse turns the transistor "off" ("turn-off" time depending on the type of transistor and whether it is driven to saturation or not.)

Using Surplus Relays

It is awfully frustrating to have a surplus relay on hand which could be used if it were not for the fact that we must build a separate power supply to operate it. These 24, 28 volt, etc., units can of course be rewound for the voltages we have but this takes time and some knowhow.

Some hams have made 12 volt relays out of their 24 volt jobs merely by unwinding ½ of the turns of the actuating coil. Of course the unit will operate, but sometimes it will heat up and eventually burn out.

Using Ohm's law to arrive at the correct number of turns for the voltage and current available is only part of the job, for wire tables must be consulted, core and solenoid area figured and the armature load (pull) calculated. Arriving at the correct gauss is not easy. Oh, of course, we hams can cut and try until we get what we want but this takes time.

For maximum relay efficiency it is better to stick to the manufacturer's specifications and utilize available current sources to drive a unit.

Many surplus 12 volt d.c. units can be operated on 6 volts without modification. Of course, the armature gap must be adjusted for the available magnetic pull.

In some cases, the winding of a relay may be substituted for a tube's cathode resistor, this being especially applicable to the 24-28 volt d.c. relays.

For low current 110 v.d.c. relays the circuit in fig. 3 can be used.

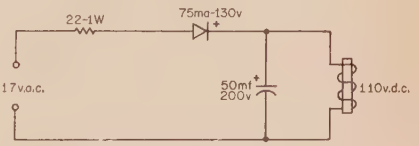


Fig. 3—Simple circuit for operating surplus 110 v.d.c. relays from 117 v.a.c. source.

If you have been lucky enough to obtain a surplus 6 volt d.c. coaxial antenna switching relay which you would like to use in your mobile installation (which is powered by 12 volts) a simple dropping resistor may be used, the value of which can be easily calculated by Ohms law. To reduce heating of the resistor, increase its wattage rating by 50%.

Relay Maintenance

Relays, because they are mechanical in operation do require periodic maintenance. Cleaning contact points, adjusting contact spacing, armature position (in some relays), checking closing and opening sequence of multi-contact relays, etc., are all part of the maintenance task. Some relays require special equipment for adjustment. For example, relays used in critical

impulse generation circuits require an oscilloscope to adjust them for minimum bounce. Contact spacing is very critical in some relays; for example, the polar type relay, which approaches .004 inches. For this close adjustment proper feeler gauges are required.

Often, a manufacturer will supply the special tools needed for maintenance of his relays. However, the relays which most hams use require nothing more than an ohmmeter, proper feeler gauge, a relay adjusting tool or a good pair of long nose pliers.

The chattering a.c. relay usually chatters because it is maladjusted. Generally, a loose armature and improper pole or head spacing cause chatter. To minimize a.c. hum, the noisy relay should be "float mounted" wherever possible, this means on springs or on sponge rubber spacers.

A relay that is not operating properly can cause radio noise due to its arcing contacts, this being especially true of the mercury wetted type relays.

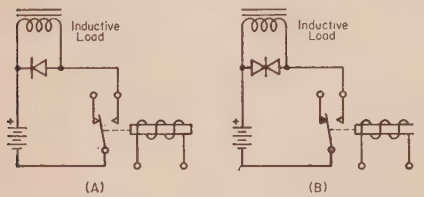


Fig. 4—(A) Using a diode to reduce contact arcing also increases release time (d.c. circuits only). (B) The use of two diodes increases the release time very little (d.c. or a.c. circuits).

When a relay's contact points burn up too often, the ham should consider the schemes shown in fig. 4(A) & 4(B). These schemes reduce arcing, its resultant burning and noise. Usually, heavy arcing of relay contacts is due to the interruption of current in an inductive circuit. Both schemes shown provide for a lengthening of release time. A capacitor and resistor, *i.e.*, a 0.1 mf condenser in series with a 500 ohm resistor placed across arcing points instead of a rectifier (diode) when around 250 volts are across the points will help cut arcing too.

The International Rectifier Co. of El Segundo, California makes silicon units expressly for relay contact protection. Write them for information.

Relay contact points should not be cleaned with sandpaper or a file. A burnishing tool or crocus cloth are the only items which will do the job properly. When cleaning contacts, make certain that you take every precaution to keep the cleaning residue off of other contacts. Even though it is fine in texture if it lands on an open contact point, the first time that contact closes there will be arcing and a welding which will increase contact resistance.

Relays often look simple but a little study will disclose that the majority of them are marvels of engineering and a book could be written on them. The few thoughts presented here are intended to acquaint the newcomer with relays and to give a few of the oldsters food for thought.

Questions

Mercury Switch "I"—"We have a modern home and our switches throughout the house are of the mercury type. When two or three (not all) of these switches are first turned on they make on heck of a racket in my receiver. Operating at night when the family is home and turning these switches on and off really is unpleasant. What can I do? I replaced one switch and after about a week it too started to give me noise."

Try the scheme shown in fig. 4(A) & 4(B) above. Try a 220 ohm resistor and a .1 mfd condenser before you try the diodes, this may be all you will need. Generally, the mercury switch is a very quiet bird.

Answers—Some of you who have received answers from *CQ* no doubt have noted that our answer is brief and to the point (wherever possible). If we had to write a page of copy on each answer we would have a three month (or more) backlog of letters to answer. We repeat, if the answer to a question can be found in a handbook or a back issue of *CQ* or any other technical magazine (we take them all) we will refer you to the source. It would be silly for us (except in certain circumstances) to write two pages on a subject when there is another easily available source of information which covers it at great length.

Those of you who send in self-addressed stamped envelopes for our reply, get *first* consideration.

As we have stated before and state again, we cannot hope to answer every question sent to us, for we do not profess to know it all and do make mistakes like all humans do.

The letter that gripes us more than any other is the guy who expects us to do *all* of his thinking for him. Gosh, we're not that good! If we recommend something to you it is our *personal* recommendation.

If we are wrong we like to be told directly and gentlemanly and not with an unsigned letter.

We will continue to do our best to serve you, the reader of *CQ* (subscriber or not) with your ham radio problems, but please remember that others want information too, so one question to a letter *please*.

12AU7 vs. 6C4—"Can I use a 12AU7 in place of two 6C4s?

Yes, in most circuits.

Transistor Supply Noise—"No matter what I seem to do, I can not get the noise generated by the transistors in a mobile power supply out of my receiver or transmitted carrier. I've tried everything. Any help?"

Yes. See fig. 5. Most hams who have the noise (and many do) try to filter out the B plus;

sometimes this works, sometimes it does not. The best approach (I have found) is filtering the input. A 1000 mf, 25 volt electrolytic in conjunction with a toroid wound choke consisting of 16 to 20 turns of number 16 copper enamel wire on a ferrite core (about 1" in diameter). Depending upon the frequency of the transistor oscillator used in the supply, you may have to adjust the value of the capacitor *up*. One case required a 6000 mf capacitor before all traces of supply hum were eliminated.

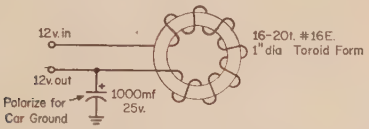


Fig. 5—One scheme for reducing transistor power supply "leak-through."

S.S.B. Adaptor—"How about a circuit of an s.s.b. adaptor (single band) for use with my DX-40. Surely you can come up with one."

This has been a frequent request. In the June issue we'll give you the info you need; a good approach to the simple adaptor. We will give you more info on modifications to the DX-40 too. Incidentally, the adaptor can be built for less than $20.00!! So look for the big June issue; HAM CLINIC will be *packed* with good solid information and be over twice as long.

Parallel Antennas—"I have a 40 meter dipole and a 75 meter dipole on separate poles, parallel to each other about 10 feet apart. Using either antenna makes the other one hot with r.f. Is there a great power loss? How much is the antenna pattern of either antenna affected? How about directional effect?"

My antenna expert agrees with me that the "power loss" is slight. The pattern of either antenna is affected very little; for it to be affected, both antennas would have to resonant and ½ wavelength apart. Measurable directional effect would be small.

KWM-2 and Window Vertical — "I use my KWM-2 with a window vertical and it seems to perform fine on 10 meters. However, the loading is difficult on the other bands. The antenna I am using is a Webster Bandspanner. What's the trick for good all-band operation?"

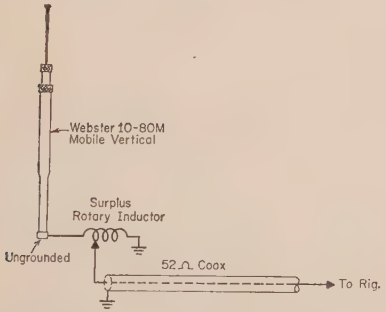


Fig. 6—Matching the Webster Band-Spanner antenna to 52 ohm coax for minimum s.w.r. This scheme may be used with any transmitter having a pi-network final, with good success.

You have two pieces of real fine equipment, the set and antenna; nothing wrong with either. Try a matching coil at the base of this antenna with 52 ohm line. The coil can be a surplus rotary coil, and is used on all bands but 10 meters. See fig. 6 for the connections. Adjust the coil for minimum s.w.r. or easy loading of the antenna.

Coaxial Vertical—"I've heard that some of the fellows have been using a 'coaxial vertical' with a lot of success. Have any info on it?"

Yes, but it will be described next month. The model we will describe was "DX tested" in an actual DX location; for an expedient antenna, it is dern good. The info comes to us from WA2TQR.

AREC—"What do you think of the AREC and is it worthwhile?"

Again, see next month's HAM CLINIC observation.

RCA Power Tubes Booklet—Those of you looking for info on vacuum power tubes, rectifier tubes, thyratrons and ignitrons can get a copy of RCA's booklet, *RCA Power Tubes* by asking for Booklet PG101E available from RCA, Commercial Engineering, Electron Tube Division, Harrison, N.J. for 75¢

Info From GE Via MARS—Scientists and engineers from General Electric Company's 8 departments have been giving, and will continue to give some very fine technical lectures over the Eastern Technical Network of the U.S. Air Force Military Affiliate Radio Systems (MARS). We wish GE would send summaries of these lectures to HAM CLINIC so that we could include them in the column from time to time.

"The Advantages of Compactron Multi-Function Tubes In Electronic Equipment" is the lecture scheduled over the network on April 1st.

Let us hear from those of you who do not receive these broadcasts, but would like to read a good summary of them.

Question of the Month

"While in Europe last year, I picked up a new thrambotron. At first it worked mighty well, but during the last couple of weeks I have had trouble with the synchro-plasmic drive. Signals injected by the elakton pump seem to be distorted, although the flamdon circuit seems to be working okeh. What bothers me is that I have very little drive from the diaramic oscillator. No matter what I do I cannot seem to get the modulation I had before. I have tried different klystro-penton tubes but to no avail. My voltage on the inducto-caparis circuit measures around 1 megavolt and the bias on my electromic buffer is in the order of 5 kilovolts. I have experimented with the hollymackerell regulator setting but I still do not have enough r.f. output. Can you help me?"

[*Continued on page 116*]

RTTY

BYRON H. KRETZMAN, W2JTP
300 W. 43 ST.
NEW YORK 36, N. Y.

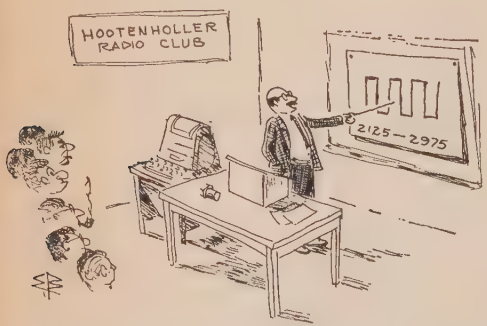
RTTY Operating Frequencies

Nets centered on frequencies given; operation usually ± 10 kc.

80 meters	3620 kc
40 meters	7040 kc
20 meters	14,090 kc
15 meters	21,090 kc
6 meters	52.6 mc

SINCE the February issue of *CQ*, your monthly RTTY COLUMN has been devoting a major portion of its space to W2JAV's transistorized radioteletype terminal gear. The February column described in detail the receiving converter, or terminal unit (TU) as it is known, and last month's column covered the audio-frequency-shift (a.f.s.k.) oscillator used for transmitting. This month we will give you the dope on the simple and small power supply that powers all of the terminal equipment. Before we get into the "nuts and bolts" we would like to emphasize the point that W2JAV's RTTY terminal gear is not highly sophisticated, nor does it employ the latest in esoteric computer techniques. What Phil Catona has done is to develop *extremely* satisfactory RTTY gear employing simple transistor circuitry; units that any ham can build and adjust. And, you don't have to be an electronics engineer to understand how it works.

RTTY The Hard Way...No. 9



"The space pulse is always on the low side when on f.s.k. and high when on a.f.s.k., but of course you may invert when you tune in the signal, which is OK unless your b.f.o. is already set on the opposite side. Everything clear?"

RTTY-Transistorized, Part III

The power supply, pictured along with the rest of Phil's transistorized terminal equipment in the February RTTY COLUMN is very small, built into a 4 × 2⅛", 1⅝" deep, aluminum "mini-box." Output is 8.4 volts d.c. at about 500 ma maximum, and it is regulated by a zener diode. You don't have to build it so small, we admit, so if the space is available don't be afraid of using larger components and spreading them out.

Figure 1 is the schematic diagram of the transistor-gear power supply. The power transformer is an ordinary 6.3 volt filament transformer rated at 0.5 amperes. If you have a larger transformer, say one rated at 1 or 3 amps, use it if you have room on the chassis or in the particular box you use. The pilot lamp is simply the pig-tail NE-2 neon lamp with a 24K resistor in series connected across the a.c. line. Again, you can substitute a #47 pilot lamp, connecting it across the 6.3 volt winding, if you have used a filament transformer with a higher ampere rating.

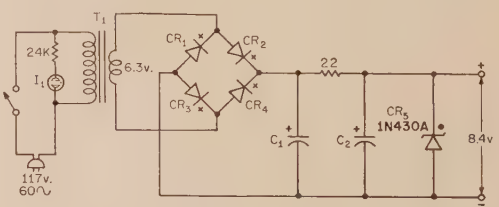


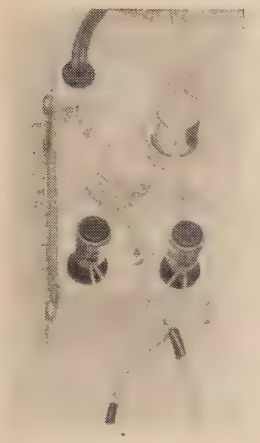
Fig. 1—Power supply for transistorized terminal gear, schematic diagram.

C_1, C_2—500 mf, 10 or 15 volt electrolytic.
CR_1, CR_2, CR_3, CR_4—1N315 diode, G.E.
CR_5—1N430A Zener diode, Hoffman Electronics.
I_1—NE-2 neon lamp, G.E.
T_1—6.3 v. 0.5 a., Merit P-2964.

The rectifier is of the bridge-type and consists of four GE type 1N315 "top hat" rectifiers. The filter capacitor sections C_1 and C_2 each consists of two miniature 250 mf 10 volt capacitors connected in parallel. Recommended substitution, if you have the room, would be to use a 500 mf 15 volt Sprague "Atom" tubular electrolytic in each section. The filter resistor is 22 ohms and can be either ½ watt or 1 watt.

Voltage regulation is achieved by use of a zener diode, CR_4, which is a Hoffman 1N430A. This diode, as connected in this power supply, works in the same manner as a gaseous voltage regulator tube such as the VR-150 or

0D3. The difference is that the VR tube maintains a voltage drop across it which is high, 150 volts for example, while the zener diode tends to maintain across it a voltage drop which is low, 8.4 volts in the case of the 1N430A. The output of this transistor-unit power supply is therefore regulated within plus or minus 5% of 8.4 volts.



Power supply for W2JAV's transistorized terminal gear for radio-teletype.

The Polar Relay

As a few final words about this transistorized set-up for RTTY operation, we would like to say something more about the polar relay, used possibly for transmitting as well as receiving, since its performance can mean the difference between satisfactory and unsatisfactory operation of the whole set-up.

First of all, let us emphasize that this relay should be in *perfect* adjustment. Ordinary relay adjustment procedures are just not applicable in this case. No spring is provided in the 255A polar relay. Its pole pieces and contacts must be so positioned that the armature spends exactly the same amount of time, measured in *milliseconds,* on each contact when equal length *mark* and *space* pulses are received. A minimum of four adjustments must therefore be made to obtain zero mechanical bias.

Secondly, proper adjustment is not a difficult procedure but it must be made in a methodical manner rather than in a haphazard way. The simplest solution, naturally, is to ask a friend who works for a telephone company to have someone who maintains Teletype machines adjust your relay in their relay test set. (This only takes a few minutes when done by a professional in a test set.) Alternatively, the solution is to learn how to do it yourself. We have devoted a whole column to this subject several times since we began the RTTY COLUMN in 1955, but you can quickly learn all about it by referring to Chapter 2, section 2.4, in the *NEW RTTY Handbook.* ($3.95 postpaid, from *CQ*) Also contained in this book is the dope on how to build an uncomplicated polar relay test set that will guarantee your adjustments.

Dayton Hamvention

The annual Dayton Hamvention will be held this year April 27 and 28th. Once again Andy Henderson W8WYL is the RTTY Forum Chairman. Your RTTY Editor has attended quite a few of these Hamventions. Attendance generally runs in the thousands, with tremendously interesting forums for DX, v.h.f., ARRL, s.s.b., and especially RTTY. We have never attended a ham radio convention or gathering where there was more for the RTTYer. Besides the discussions, there has been a door prize (RTTY Forum only) of a machine, last year a Model 28!

RTTY on V.H.F.

6 Meters: Most of you know that a.f.s.k. RTTY operation is on 52.6 mc. Our experience is that this a.f.s.k. is on f.m. (F-2) for the most part, using the commercial surplus police-type ex-mobile gear. There were some isolated cases of this operation on a.m. (A-2) years ago, before the advent of the newer (and hotter) f.m. equipment, but we haven't heard of any a.m. RTTY on 6 meters lately. Have you? Or shall we just put "f.m." in the frequency box along with the 52.6? Drop me a card if you are working 52.6 mc and let us know if it is a.m. or f.m. that you are using.

2 Meters: Prior to June 1960, when the top 100 kc of 2 meters was legislated into c.w. only (A-1), the "national" RTTY frequency was 147.96 mc. Operation on this frequency was largely a.m. because of the tremendous post-war availability of the SCR-522, ARC-1, ARC-3, and ARC-5 v.h.f. airborne sets which needed only power supply conversion. The exceptions were Detroit and Chicago, which were the first cities to use the better f.m. police-type sets on RTTY. (They used other frequencies to avoid conflict with a.m. operations.) It should also be stated for the record that there was some operation on 144.138 mc in the New York City area because reception of autostart a.f.s.k. on this channel was used to trigger a repeater on the top of a sky-scraper which then re-transmitted the 144.138 mc signal on 147.96 mc.

Since we no longer can use 147.96 mc for a.f.s.k. we should agree upon a new "national" RTTY frequency. It is most logical to select *two* frequencies, one for a.m. and one for f.m., since these two emission types are not compatible. In regard to f.m., it should be noted that Chicago is on 147.7; Detroit and Cleveland are on 147.3 and, St. Louis and Indiana are on 147.24. Also, the "national" f.m. calling frequency for *phone* operation is 146.94 mc. K4ZAD, who publishes the *F.M. Net Directory,* suggests that we pick an f.m. frequency in the upper RACES segment of the band. In regard to a.m., California still operates on 147.85. What do *you* think would be suitable a.m. and f.m. frequencies for 2 meters?

[*Continued on page 116*]

sideband sideband sideband

SIDEBAND

IRV and DOROTHY STRAUBER,
K2HEA/K2MGE
12 ELM STREET, LYNBROOK, NEW YORK

SSB DX HONOR ROLL

TI2HP	260	W2LV	203
VQ4ERR	257	PZ1AX	201
W8EAP	252	W1LLF	200
W8PQQ	251	W2TP	200
W6UOU	245	WØUUV	200
W2ZX	244	W3LMA	200
PY4TK	234	TG9AD	200
WØQVZ	233	K1EJO	200
W2JXH	228	W2VZV	198
K2MGE	228	K6LGF	188
W6PXH	227	W2YBO	187
K8RTW	226	G8KS	186
W2FXN	225	G2BVN	185
K9EAB	225	W1AOL	183
W4OPM	225	K2FW	181
W6RKP	224	W5RHW	180
MP4BBW	224	K4PUS	179
W6BAF	219	DL1IN	178
K4TJL	218	K1IXG	178
W6WNE	218	W3VSU	177
W3MAC	213	K6MLS	177
W5IYU	209	W2NUT	175
WØCVU	206	G3NUG	175
K6ZXW	206	W1ORV	175
W3KT	205	PJ2AA	170

CQ SSB STICKERS AND CERTIFICATES

Worked 250
W8EAP

Worked 225
W4OPM W2JXH
W6PXH K8RTW

Worked 200
TG9AD K1EJO

Worked 175
W1ORV K4PUS
W1AOL K6MLS

Worked 150
W2BQM

Worked 125
W9YHE WA2IZS

Worked 100
DL4FX WA2IZS
K9WUR UC2AA
W7BPS UB5WF
KP4CL DL6EQ

Worked 75
UA2AO KL7MF

Worked 50
G8TY KØMAS
9N1GW W8JAQ

WE SWUNG the beam on a 135 degree heading, consulted the azimuth chart of Alpha 2, checked the GMT tables, calculated the proper beam elevation with our Handee Dandee Bounce Calculator and energized the AZ-EL unit. With the selsyns humming merrily and the panel indicator showing the Auto-Track Unit ready to go, we turned on the linear, flipped the tracking unit to "auto" and let out with a CQ DX. Right back came ZS1DDD, loud and clear! We chatted away, while outside we could hear the faint noises of the beam motors keeping the beam on Alpha 2 as it moved through the airless void 1000 miles above the earth. The indicator light on the AZ-EL Unit remained green as the unit kept the beam automatically tracking the satellite. After a nice long chat with our ZS1 friend, we switched off the AZ-EL unit and reached for the Beta 3 chart, made the necessary adjustments and swung the beam to catch it as it came over the horizon. The Auto-Track took over and we called CQ DX Europe; DL1CCC came right back and we traded insults for half an hour or so before we remembered that we had a "sked" with VK3GGG coming up; so, we excused ourselves and reached for the chart on Gamma 4. Again the AZ-EL Unit did its job and we listened on 14316 for our VK3 friend. Boy, oh, boy; listen to that QRM; seems like everybody these days has gone bounce happy!!! Oh, well—it was too good to last!!

Fancifull? Could be right now, but we wouldn't be too sure about the day after tomorrow!!

With communication satellites a coming thing and moon bounce a proven possibility, it won't be long before we can look forward to bouncing our signals from a moving re-

Joe O'Driscoll (left) and Frank Halpin, EI4J, (right) seem to be scheming about how to raise Frank's beam just a wee bit higher to give him an even more potent signal. The strongest Irish station on sideband, Frank can usually be found on 20 meters around 1400 GMT in a roundtable with his special friends, Father Larry, WA2DWH, and Father Con, K7NUO. Joe is one of the vast army of unsung heroes who devote their time to being helpful to other people. *(Photo courtesy of EI8P).*

flector 1000 miles up. The electronic systems needed to keep a beam tracking on the satellite are already highly developed and with typical ham ingenuity, we will simplify and home brew the necessary equipment to enable us to use communication bounce satellites for DX'ing.

Bud Drobish, W9QVA, is one of Hallicrafters goodwill ambassadors and is a welcome guest at many ham conventions throughout the country. *(Photo by K2HEA).*

Something Must Be Done!

As many of you know, the editors of this column also edit the publication of the Single Sideband Amateur Radio Association. In our February issue of *The Sidebander*, we discussed the subject of 20 meter sideband operation in an editorial "Something Must Be Done." For the benefit of those who did not see this article, we are reprinting it in this column so that the greatest number of sidebanders will be made aware of the problem and, we hope, take the necessary steps to solve it.

Something Must Be Done

Yes, something must be done—and now—about the crowded condition of the twenty meter band. Sideband operation has mushroomed with such a fantastic growth that the so-called "gentleman's agreement" for sidebanders to remain between 14270 and 14350 has long been outdated and invalid.

Our mailbag has been full of various suggestions, some of which we'd like to bring to your attention. From Dale Kentner, W2ZX, comes the following: "The survey (ARRL Band-Usage Survey) shows that approximately 55% of W-amateurs on 14 mc are on phone but that only 43% of the band is allocated for their use. Obviously then, a further widening of the phone band is in order. "This time, let us set the lower band edge at, say 14160 kc and the upper band edge at 14330 kc thus achieving idealized a.m.-s.s.b. back-to-back W transmitting regions on the high side for s.s.b. DX and on the low side for a.m. DX (as before). We pay for this only by virtue of tapping into the paradoxical 14100 to 14200 kc region which, in recent years, has been occupied only very inefficiently by Central and South American a.m. phone and by commercial RTTY."

On the other hand, Larry Eisler, W3JTC, ex-SVØWP, has a different approach to the problem: "At some fixed date—or else soon after this appears in print—all those U.S. amateurs using s.s.b. phone on 14 mc shift their operations to the low end of the U.S. phone portion of that band. Regular a.m., f.m., p.m., etc. users shift their operations to the high end of the band . . . One major advantage is that it would keep the high end of 14 mc active with amateurs in the world's most heavily populated country by amateur standards. Further . . . it would put a stop to the constant on-the-air bickering of U.S. amateurs, regarding frequency usage for DX phone patches, DX work and the like. The conversations which are a daily occurrence are being heard overseas as well as within the USA. They are very poor advertisements for a country that has set the pace for good amateur operating practices, codes, etc."

While each of these suggestions has some merit, we do not feel that either is the complete solution to the problem. In the proposal voiced by W2ZX, the area from 14330 to 14350 would be reserved as a region for outside-the-USA s.s.b. operation. With the great increase in the number of s.s.b. DX station, it seems hardly likely that 20 kc would be sufficient to accommodate all these operators. Although Dale might have in mind the use of this area for primarily DXpeditions and rare DX stations, who is to tell the more plentiful DX sidebanders in the U.K., Germany, Sweden, Italy, and South Africa that they should not fill up this region with ragchewing when certain operators are looking for the rarer countries, with more restricted s.s.b. operation?

Referring to Larry's suggestion, it is difficult for us to visualize that time in the future, when a.m. stations will voluntarily move *en masse* from one end of the band to the other just because a group of sidebanders feel that is the wisest move. Although we are among sideband's most enthusiastic boosters, we never lose sight of the fact that each operator has his own private interests which should be respected. Those operators who still insist on clinging to what we feel is a now-outmoded form of phone operation do so either out of economic necessity or sheer stubbornness. Our forcing them to move will only increase the antagonism which they now feel.

We have our own solution to the problem which is not as abrupt nor as immediate as the above two but which we feel will be the result of the natural growth of sideband. We suggest a widening of the sideband portion of 20 meters—*This area now to encompass the frequencies from 14250 to 14350*—a move very much in line with the information gained from the ARRL Band Usage Survey which shows that sideband now comprises 2/3 of the phone operation on 20 meters. We further suggest that, because of the recent upsurge in sideband operation among USA operators, now is the time for DX stations to move their operations to the area 14100-140 and state where they are listening for USA sidebanders between *14250* and *14300;* leaving the top 50 kc available for W/K rag-chewers, traffic handlers, etc. In this way, the W/K sidebanders interested in DX would be listening outside of the band and would not be subjected to any of the massive W/K interference now so common to their DXing. The stations above 14300 would find themselves free of listening to "CQ DX" and could carry on their varied activities uninterrupted.

The question of what to do about 20 meters is a very serious one. It was once hoped that, through the passage of time, the problems affecting 20 would be solved. This has not proved to be the case. It is time that we, the members of the SSBARA, and through us, the ARRL, come out with a definite proposal to be accepted by all and restore 20 meters to the enjoyable band it once was.

We would like to have an expression of your opinion. What's more important, we'd like you to send copies of your letters to the ARRL so that it can make appropriate recommendations which will have a far-reaching effect on all operators within the 20 meter band. Don't let the other guy do it. Let's hear from *you!*

Worked 100 and 200 Certificates

All stations must submit QSL cards clearly marked 2-way S.S.B. together with an alphabetized list and sufficient return postage for these certificates and your cards. Listing forms will be sent by Sideband Editors and below listed stations upon receipt of your self-addressed envelope, stamped or with IRC's.

Worked 50 and 75 Certificates Stickers for 125, 150, 175 etc. Countries

All stations must submit only an alphabetized listing of confirmed 2-way s.s.b. contacts verified and attested to by another amateur. No cards need be submitted. Include letter postage.

African Stations

Send cards with lists to ZS6AMV, A. J. Louw, 52 Wargrave Ave., Aukland Park, Johannesburg, Tvl., South Africa from the following call areas: All ZS's, ZE, VQ2, ZD6, CR6 and CR7.

All sideband stations in the other African call areas, send cards with lists to Awards Manager, R.S.E.A., QSL Bureau, Box 30077, Nairobi, Kenya.

United Kingdom and Ireland

R. F. Stevens, G2BVN, 51 Pettits Lane, Romford, Essex, England, will verify your cards provided they are accompanied by listings.

Europe

All European sidebanders may send their cards to Jakob Laib, HB9TL, Weinfelderstr. 29, Amriswil, TG, Switzerland.

Australia, New Zealand and other Oceania

All sideband stations in these areas may send their cards to Jock White, ZL2GX, 86 Lytton Road, Gisborne, New Zealand.

Other Areas

Direct to the SIDEBAND Editors, 12 Elm Street, Lynbrook, L.I., N.Y.

In every area, return postage must be included!

SPECIAL ANNOUNCEMENT!

IN recognition of the increased activity on 40, 75, and 160 meter DX sideband operation, we will endorse the *CQ* SSB certificates especially for the individual bands. For these bands only, you must submit all your cards either to the SIDEBAND Editors at the above address or to the following; in the U.K., G2BVN; in Europe, HB9TL; in Northern Africa, VQ4ERR; in South Africa, ZS6AMV; and in Australia, New Zealand and other Oceania, ZL2GX. Who will be the first station to earn *CQ*'s "worked 50" on 40, 75, and 160? It could be *you!*

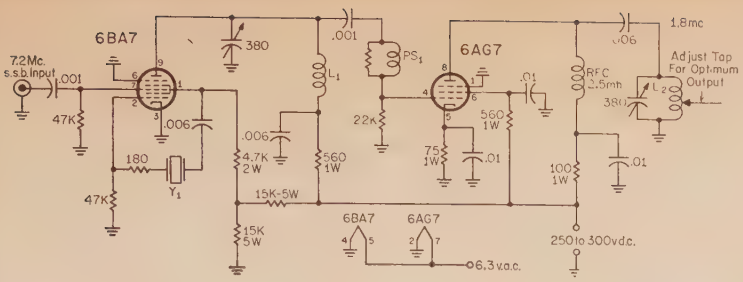
Here's a wonderful gal who has made more good friends on sideband in a shorter time than anyone else we can think of. She's Harriet Hair, K9WUR, of Fontana, Wisconsin, who was an s.w.l. for many years before getting her license in 1960—all on her own, we might add, after which she helped OM, Al, study for his exam.

Top Band

Activity has been increasing slowly on 160 meters and for those who do not have the capability built into their exciters, Tony W2FYT, has made available for publication a mixer-amplifier circuit that can be used with any commercial s.s.b. exciter. To quote from Tony's letter:

"My s.s.b. exciter is an HT-32 which does not have 160 meters available. To use the mixer-amplifier, I disable the 6146 amplifier stage by removing the high voltage rectifier tube. The screen voltage still remains on the tube but there is enough bias on the control grid to keep the screen dissipation within safe

Lilo Wichmann, DL1SDC, is currently Germany's most active XYL on sideband. Using the Collins S-Line and a 3 element beam 60 feet high, Lilo and OM, Wolf, DL1SD, are always ready for a good ragchew from their home near Hamburg.



Outboard mixing unit for commercial s.s.b. exciters not incorporating 160 meter operation, designed by W2FYT. L_1 and L_2 should be adjusted to resonate with approximately 300 mmf.

PS_1—5t. of #18 wound on a 56 ohm, 1 watt resistor.

Y_1—5,400 kc or 9,000 kc. Sideband sensing will reverse, depending on crystal used.

limits. This arrangement has been in use for six months and I haven't lost a 6146 yet!! I then couple the 7.2 mc s.s.b. signal from the 12BY7 driver by slipping off the tube shield and placing a metal clamp around the tube envelope. This metal clamp becomes the coupling capacitor which couples the 7.2 mc signal to the mixer. A short length of low-capacitance coaxial cable is then connected from this clamp to the input of the out-board mixer-amplifier unit. No holes or butchering of the commercial gold plated rig."

"Some of the active 160 meter s.s.b. operators are: W1HKK, W2FYT, WA2OKK, K5TSI, W8HPG, W9OJX, VE2PZ, W1FRR, W3FBV, K6HXT, K8EVG, W9KXJ, W1BSY, K2EII, W3PAP, KH6IJ, W8PAL, W9TFS, W2LYE, W2YIB, W4RL, W8GIY, K8OXE, WØIFH, W2BQM, K2PNF, W4VWU, K8JDM, W9IYK, WØFDL.

W1FRR, W1HKK and myself are interested in conducting week-end tests on the 160 and if any of your readers are interested in participation, please contact me at 6 Yorktown Road, Bordentown, N.J."

How about it fellas—anyone for 160?

VHF Sideband

We are looking forward with interest to the appearance of two new items of sideband gear; in fact, the only really new items produced by a major manufacturer in some little time. These are the 2 and 6 meter Transverters being made by Hallicrafter and coming off the assembly line at the time we write this. There will probably be a considerable number of these units on the air by Spring, just in time for some of those temperature inversions that v.h.f. DX'er loves so much. The two meter version will be the first one off the line and it will be interesting to see what new records will be set using s.s.b. instead of c.w. for DXing on two meters.

Tests made with prototypes have shown that phone contacts can be made with s.s.b. when a.m. is no longer copyable and, if we can get a few bounce type satellites up in the air, who knows, we might be able to work coast to coast using two meter sideband. Something to think about, hey?

Six meter sideband DX also sounds like a real challenge. There is some activity around the low end of the 50 mc band at present; with these units, six meters should really get a shot in the arm.

Sideband Around the World

A number of our formerly active sidebanders have been among the missing for the past number of months, among them Peter, ZS7P, whose beam was struck by lightning; Joe, 9G1BF, who is back home in the Guernsey Islands on leave; and Chaim, 4X4LC, who is now in the U.S. to continue his education . . . Keep your ears open for Vic, W1TYQ, who is now living in Saudi Arabia and is expected to provide some further operation from the Neutral Zone. . . . Their many friends will be delighted to hear that EL4A and EL4YL are now on sideband. Ken was putting through a good signal with his 35 watts when we contacted him but he was planning to replace his old receiver with one that would copy sideband better. . . . The swing to 80 meters continues to gain adherents; among those we've heard on the band are GW5TJ, G3NVA, UB5UW, F7DB, G3DO, G3MA, OE1RZ, G8PO, VP2VI, DL1UX, OK3KAB, and OZ5VL. All of them have been coming

(*Continued on page 98*)

Peter, ZE4JC, (left) and John, W2ESZ, at the 1961 sideband dinner in New York. John has authored a book on a new philosophy which he claims will revolutionize our present day thinking.

Here is the neat station of Ken Kishimoto, JA3UI, who is one of a growing group of Japanese amateurs on sideband. *(Photo courtesy of W2JXH).*

YL

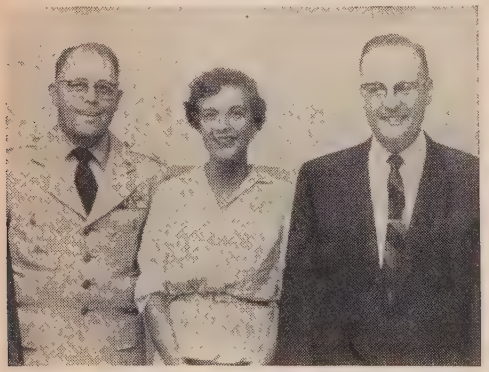
BY LOUISA B. SANDO, W5RZJ
4417 ELEVENTH ST., N.W.,
ALBUQUERQUE, N. M.

PUBLIC service, with a capital "P," seems to be the motto of the Barber family, the "P," also standing for Phone-Patching and, thereby, Pleasure. It all started for Jean and Dick a couple of years ago when they went on the air as KØZZE-KØZZF and heard KG1FR in Greenland. After running some 2,000 patches for this station, Jean and Dick were presented the U.S. Air Force Scroll of Appreciation.

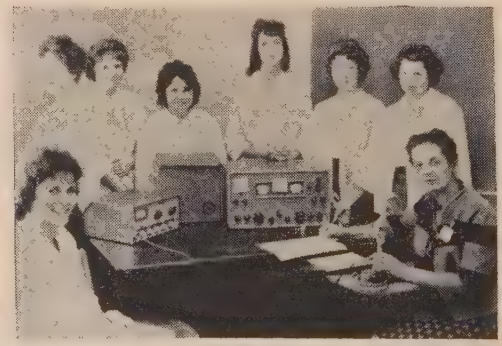
As Jean tells it: "Dick was a radio operator during WW II and had served in the Alutians so realized what it was to be isolated. Due to the fact the rhombic is designed for the center of the U.S.A. and we can copy Sondrestrom 5-9 most all day, we just naturally got into the phone-patch business. KG1FR has about six regular skeds a day, with stations all over the U.S.A., but due to skip conditions they can't always run patches. We hear them every day and if other skeds don't show up or aren't patch quality we just check in and run the ones they want to get out. We have run many others for all over the arctic, but this one station is always in. With cooperation from the local telephone company and switch-board operators we have run over 2,000 for that one base. After the 2,000th we haven't kept count! They are all long distance as Anthony (Kansas) is a very small town and we live ten miles from the town.

"Since the station runs patches all week up in Sondrestrom, Sat. night is the night for the ops to ham. It has lead to a 'date' every Sat. night for almost two years. We got acquainted with each of the operators, giving them nicknames. In fact 'FR' became a household word. Our shack is on a porch right off the living area and even the three harmonics know all the operators. Last spring Dick and I went up and visited the 'Frozen Rabbit' and we saw the fjord and icecap they had talked to us about for over a year. We keep telling them we are the 'center of the universe' and have had many 'eyeball' QSO's with the boys as they rotate back to the states. It has been a grand experience."

The Scroll was presented to the Barbers at a Kiwanis Club dinner. Jean says it came as a complete surprise and that they really get a great deal of pleasure from running the patches, as well as feeling they can serve others.



Col. Gandy, KØRVI (left) presented the U.S. Air Force Scroll of Appreciation to Jean and Dick Barber, KØZZE-KØZZF, for their many phone patches from KG1FR, Sondrestrom, Greenland. After the 2,000th patch they lost count, but still keep daily skeds.



Pictured with their station are these recently licensed YLs and Mrs. Vivian McCracken, Director of Girlstown U.S.A. L. to r., WN5ASZ, Sandra; WN5APM, Donna; WN5AOG, Linda; WN5AUJ, Ella; WN5AUI, Bonnie; WN5AUQ, Nina; WN5APG, Carol. (Details in Feb. CQ.)

YL VHF Contest

Time: Start Wed. Apr. 11, 1962 at 12 noon EST.
End Thurs. Apr. 12, 1962, 12 midnight EST.

Eligibility: All licensed YL and XYL operators are invited to participate. YLRL members only are eligible for the WRONE award. A non-member high scorer will receive a certificate. Contacts with OMs will not count. A special certificate for the highest scoring Novice operator.

Operation: Bands: 50 mc and above are to be used, phone and/or c.w. Crossband operation is not permitted. Only one contact with each station will be counted. A section may be counted only once as a multiplier.

Procedure: Call "CQ YL."

Exchange: Stations worked, QSO number, RST report, ARRL section, U.S. possession, VE district or country. Entries in log should also show band worked at time of contact, whether A1 or A3, time of contact, date, transmitter and power.

Scoring: Multiply number of contacts by the total number of ARRL sections, U.S. possessions, VE districts or countries worked. Contestants running 50w input or less at all times may multiply the above result by 1.25 (low power multiplier).

Awards: Highest score—WRONE award (to a YLRL member only).
Top 3 scores will receive certificates.
Highest score in each ARRL section, U.S. possession, VE district and country will receive a certificate.
Highest Novice score will receive a certificate.

Logs: Copies of all logs must show claimed score, be signed by operator and be postmarked not later than April 27, 1962, and received not later than May 11, 1962. Send copies of log to K2JYZ, Lillian Byrne, 24 Stillwell Pl., Freeport, L.I., N.Y. No logs will be returned. Be sure it is a copy of log you send.

Thanks, YLRL

Speaking of scrolls, your editor received one recently from the 1961 officers of YLRL signed by K5BNQ, Doris, which reads: "This lasting tribute is presented by the members of Young Ladies Radio League to W5RJZ, Louisa Sando, for faithful service [as] *CQ* YL Editor and author of *CQ YL.*" Thank you, gals; this is the nicest thing that has happened to us in a long time!

TYLRUN officers for 1962: L. to r., K5BNH, Bea; K5YIB, Barbie; W5JCY, Bertha; K5BNQ, Doris (YLRL president in '61).

DX YLs

Among the YLs in this country there seems to be an increasing awareness of and interest in sister Hams around the world. The latest *YLRL Directory,* compiled by K6OQD, lists nearly 70 DX YL members (exclusive of VE's), the majority of whom have been sponsored to membership by YL clubs and individuals in our country.

Recently the new DX 100 YL award has been announced as one of the awards sponsored by *The Monitor.* The custodian, *Monitor's* YL Editor, W5JCY, says it is her aim to bring the DX YLs more to the attention of ops in the U.S.A. Bertha has worked 132 of them so she knows they are there and wanting contacts. Both YLs and OMs are eligible for DX 100 YL, contacts count since March 1, 1956. Send list of confirmed contacts (QSLs must be on hand) certified by two other amateur operators and 25 cents to cover handling costs to W5JCY, 316 E. Hurd, Edmond, Okla.

And now there is a special net for DX YLs.

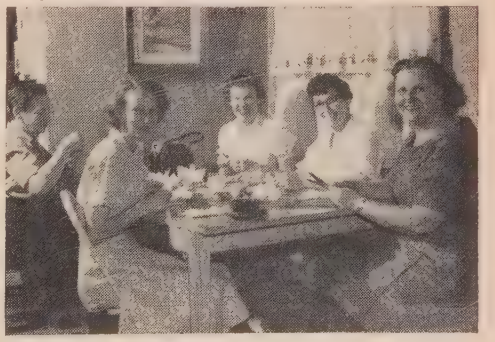
AHOY—YL FINS!

A new weekly net organized by the Floridoras exclusively for DX YLs went into operation in December. Known as the YL FINS (Floridora INternational Ssb'ers), the group meets at 1700 to 1900 GMT on Thursdays at 14,277 kc, with alternate frequency 21,395. Prior to launching the net the Floridoras contacted YLs in 37 countries and found instantaneous response. In addition to the regular certificate issued DX stations who contact 5 Floridora YLs, the nautical theme of the YL FINS is being carried out in a special award issued DX YLs who check in five consecutive times.

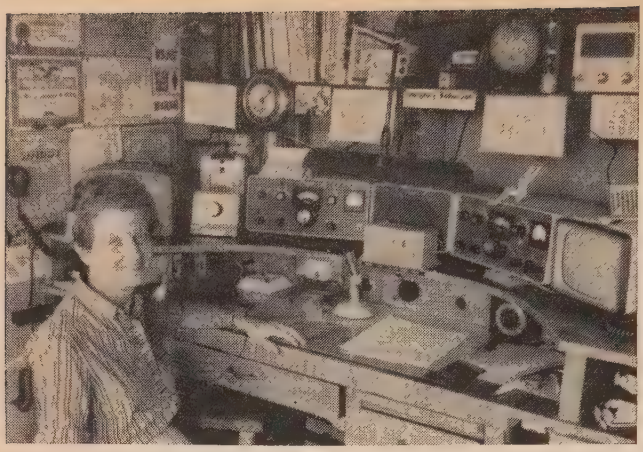
Coming Conventions

March 30-April 1: All California YL Convention, also dubbed the "April Fool Fun Fest." Sponsored by BAYLARCs, at Whitcomb Hotel, San Francisco. Details in Feb. *CQ.* WA6JGR, Eleanore, advises the banquet will be $5 (previously listed at $4.50).

May 18-19: 12th Annual Mid-west YL Conven-



Hard at work on National Convention surprises are these members of Portland Roses, l. to r., K7BII, Mary; W7GRC, Lil; W7QKU, Donna; W7HPT, Bev (who is P/C for the Roses and a senior in college), and K7BED, Bettie.



K4RNS, Marge Campbell, at the very FB station she shares with OM Jim, K4RNR. Marge belongs to DBARA, AREC, Floridoras (past president), Georgia Peaches, SSBARA, Grandmother's Club, CHC. They use the Collins S-Line, plus Gonset gear on 2 meters.

tion: This is being sponsored by the Genesee county R.C. and will be held at Flint, Mich. at the Howard Johnson Motor Lodge, G-3129 Miller Rd. (Jct. M 78 and U.S. 23). W8ATB is chairman; registration, $2 in advance. The hospitality room will open at noon Thurs. with coffee and goodies and a warm welcome to all. Dutch luncheon at noon on Fri., but the buffet supper will be furnished by the Flint YLs at the Lodge followed by games, QRM party, bowling and pajama party. Sat. the luncheon will be held at Knapps Restaurant ($2), followed by business meeting, picture taking and prizes. The banquet ($4) will be at 7 P.M. at Walli's Supper Club (G-5432 N. Saginaw Rd.), followed by entertainment, OMs welcome. Get your registration in early to W8ATB, Esther Stuewe, G-4098 E. Atherton Rd., Flint 7.

June 1-2-3: Southwestern Division Convention: At famous Disneyland Hotel, Anaheim, Calif. Fun for the whole family. Full details in March *CQ*.

Sept. 1-2-3: National Convention, Portland, Ore.: YL-XYL activities sponsored by the Portland Roses.

Here and There

ALAMO YLs have these officers for 1962: Pres., K5YCE, Gerry; V.P., K5TSZ, Katherine; sec.-treas., K5UTO, Sally. The ALAMO YL certificate is available to any station working three of their members (4 for Texas hams). Mail log information and 25¢ for handling to W5WXT, Inez Cole, 320 Meadowbrook, San Antonio.

Some of the Washington State YLs pictured at one of their occasional luncheons. L. to r., front row: K7KHU, Orissa; W7LXQ, Jane; W7NJS, Beth; K7OZC, Marge, with jr. op. Standing: K7NHZ, Dorothea; K7CPB, Phyllis; W7LCS, Toddy; K7HSB, Helen; K7QMG, Milly.

Please note this new QTH for YLRL's Treasurer: K6OQD, Jean Kincheloe, 12007 So. Georgette Ave., La Mirada, Calif. If you haven't yet paid your YLRL dues, send them to her at this new QTH.

Our sincerest congratulations to W1HUH, Sister M. Emiliana, who celebrated her Golden Jubilee (50 years) as a Sister in the Catholic Church. Sister Emiliana, who has been licensed for 28 years, was the first religious Sister in the world to hold an amateur radio license.

Congratulations, also, to W1ICV, Jane Anderson, for having earned certificate #49 for WAZ 2-way s.s.b. Her OM, W1OOS, received #50. . . . Again, congratulations, this time to ZS1RM, Margery Snyman, and W1YPH, Leona Peocor for earning WPX on c.w. ZS1RM is the second YL with this achievement (K2UKQ, Kay, was first), and W1YPH is the third.

Now on the sad side—from W7NJS, Beth, we hear of two more YL Silent Keys: WA6-FZC, Irene Doramus of McCloud, Calif., and W7HGS, Beverly Robison, of Amity, Ore. Beverly leaves three school age jr. ops and OM K7AKZ. Her father also is a ham.

Yours for the Asking . . .

Referring to the new supplement to *CQ YL*, of course. Just send your name and QTH, plus a couple of 4¢ stamps for mailing, and we'll send you pages 36-C and 36-D to bring your copy of *CQ YL* up to date re: YLRL officers, YL clubs offering certificates, etc. (Supplement pages 36-A, 36-B also are still available if you don't yet have them.)

Frank, K9ILK, writes, "I really treasure my book and refer to it so often." If you don't yet have a copy of *CQ YL*, the one and only book about the YLs, order from this column editor, $3 postpaid. 18 chapters, over 500 photographs.

33, W5RZJ

AN IMPORTANT MESSAGE ABOUT HARVEY'S NEW GLOBAL ORDER SERVICE...

A special handling service has been set up by Harvey Radio to handle world-wide orders promptly and reliably – to assure the equipments safe arrival in perfect operating condition in the quickest possible time. Here's how it works:

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- Each product is carefully packaged to exacting overseas requirements. Proper protective shipping methods assure you that your equipment will arrive in perfect condition.

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See us at the Single Sideband Amateur Radio Assocation Hamfest and Dinner. Statler-Hilton Hotel, N. Y. C. March 27th from 10 A.M.

For further information, check number 32, on page 126

Space [*from page 71*]

signed for this technique, can be obtained free of charge directly from the Project OSCAR Association.

Space Chronicle

Due to shortage of space, the Space Chronicle originally scheduled for this month, will appear in next month's column. The Chronicle will include vital statistics on all satellites launched to date.

Correction

In last month's column, the caption under the photo of F8SH, W3ASK and K3NVS, erroneously credited F8SH as being "in charge of building France's first space telecommunication ground terminal." Actually the terminal is being built at Lannion, in northwestern France, by the French Government. A Government Agency, CNET, is in charge of the project. F8SH is in charge of an important part of the project which has been awarded to the company for which he works, the CGE of France.

73, George, W3ASK

Propagation [*from page 62*]

1962. This reduces the latest smoothed sunspot number, centered on July 1961, to 52. A smoothed sunspot number of 36 is predicted for April 1962, as the solar cycle continues its rapid decline.

Daylight Savings Time

During late April many communities in the United States go on *daylight savings time*. All times shown in the *CQ* PROPAGATION Charts are given in *local standard time*. If your community shifts to daylight savings time, be sure to *add one hour* to all times of band openings shown in the Charts.

73, George, W3ASK

DX [*from page 59*]

TT8AE	via TT8AA
VK8TB	via W8DPF
VP2AC	via VE6BY
VP2MB	via W4CKB
VP2SQ	via K3COW
VP2VH	via W3ITW
VP4BY	via VE6BY
VP9FR	Fred W. Riefel, Civilian Engineering Sqdn. Box 2316 APO 856 N. Y., N. Y.
VR4CV	via K6EC
VS9APH	M/Sig. P. Hudson, Seargeants' Mess, RAF, Khormaksar, BFPO 69, London
VS9KAC	J/T. A. Cake, Block One, Middle Annex, RAF Khormaksar BFPO 69, London
G3GPE/VS9K	Sgt. K. Smethurst, Seargeants' Mess, RAF, Eastleigh, BFPO 10, London
G3OLV/VS9K	A. S. Coombs, 113 Blenheim Gardens, Wallington Surrey, England
G3NAC/VS9K	via *R.S.G.B.*
VU2SO	via W8QNW
ZD1JWC	c/o Freetown, Dept. of State, Washington, D.C.
3V8CA	USOM, c/o American Embassy, Tunis, Tunisia or via W4YWX
5R8AD	via W8QNW
6O1ND	c/o American Embassy, Mogadiscio, Somalia, Republic
9G1DT	via W4HVE
9M2AF	via W8DPF
ex-9N1GW	Glen Ward K3PQO, 6844 Kerby Drive, Washington, D.C.
9Q5AAA	via W2HMJ
CR7CS	M. S. de Almeida, C.F.M., Xinavane, Manhica, Mocambique
HH2FA	Box 235, Port-au-Prince, Haiti
HK7BE	Box 222, Bucaramanga, Colombia
TN8AF	Box 138, Brazzaville, Republic of Congo
9U5DS	Des, Box 1186, Usumbura, Ruanda-Urundi

Sideband [*from page 93*]

through with signals stronger than those heard lately from Europeans on 20 meters! . . . Bill, VP2DA, is now on s.s.b. from Dominica . . . Best wishes to Ari, PAØFM, who has moved to Sydney, Australia. . . . The very first sideband XYL to be heard from the U.K. is Jonnie, G3OJW, whose OM is G3BWY. Listen for her to check into the International YL Sideband Net on Thursdays at 1800 GMT. . . . Although Angus, 5N2AMS, from Gabon showed up as promised, he only managed to make 520 contacts, leaving behind many times that number in disappointed DXers. He did a fine job of controlling the pileups and it's too bad that more contacts weren't made. . . . VK9RO told Marcia, WA6MAZ, that there would soon be a permanent station on Papua. . . . When Hans, PAØZD, came to New York for the Sideband Dinner in March, he found a birthday cake at his place to help him celebrate. . . . Andy, LA8LF/MM, enjoys the distinction of being the only Norwegian who is /MM on s.s.b.! . . . A very interesting contact with Wes, 9G1GN, disclosed that he is in Accra, Ghana, with his wife, Edna, and four youngsters, on leave from the Canadian Broadcasting System to set up television service in Ghana. The entire family is enjoying their stay immensely and Wes is looking forward to another overseas assignment when his current task is completed . . . There's no holding Hal, HR3HH, now that he has made such a splash on 80 meter s.s.b., he's out to conquer 160. . . . Attention all former TF2 stations: please check your logs for a contact with George, PJ2AA, whose worked many stations in Iceland and has spent a small fortune in IRCs for a TF2 card without any success whatsoever. He'd sure appreciate one of you sending him a card! . . .

Bandhopping

"THE TWIST" has even invaded sideband; As witness what befell Bill, W4PR, of Birmingham, Ala. when he escorted his daughters to a dance and became so imbued with that twistin' rhythm that he broke his foot! . . . Conditions may have been poor on 20 for DXing but they certainly have encouraged more sidebanders to show up on 75, giving all the wonderful opportunity of meeting those who cannot be copied on the long-skip bands. We were delighted to have a long chat with Al, K1IXG, and Bob, K1ELS, on 75 when normally we can only hear them being called on other bands. Ditto for Gene, W5IYU, whom we can rarely contact on 20. . . . Pep, WØOSR, has been adding his sparkle to sideband in a big way ever since his recovery from an illness last year. Here's a man who immediately makes you feel that he's your friend rather than just a casual contact. Welcome back, Pep! . . . Henni, WA2DLK, again wrote, directed, and produced another show for her PTA group which was so delightful and professional that several television and movie producers are considering adapting it to

[*Continued on page 100*]

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida
Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-TI2TG)

V-80 VERTICAL ANTENNA

FACTS

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- Uses one 52 ohm coax line.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Four metal mounting straps furnished.
- Special B & W loading coil
- Non-corrosive aluminum used exclusively.
- Omnidirectional radiation.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.

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For further information, check number 33, on page 126

SSB [*from page 98*]

their mediums. When you hear this beautiful dynamo on the air, ask her to tell you the story of the last minute power failure at the school! Quite a story. . . . Driving through Lansing, Michigan? Try to meet Shirl, K8EGT, who owns the local trailer park. He gave us a most interesting description of his work and provided a very pleasant half-hour of stimulating conversation. During our chat, Shirl told us the story of Howdy, W8SQP, who intercepted an emergency call from Venezuela for medicine for a dying man and, with the great help of V. Mayree, K4ICA, who drove 30 miles to get the medicine to an airport; Pete, W4EFH; Arcy, K5SGK; and K8LOY; Howdy saw the mission completed. . . . Everyone is getting quite a kick out of working the U.S.S. *Cutlass*, with Dan, W4NMK, operating. What makes the contact unique is that the ship is a submarine! . . . Among our sidebanders who covered the "man shoot" were Dave, W2SNM, who was held over in Florida so long that he almost became a native; and Bob, W2VCZ, assigned to television duty aboard the U.S.S. *Randolph*. However, Bob's being away did not hamper his DX activities. He made prior arrangements with a ham buddy to activate Bob's station whenever a rare piece of DX showed up! . . .

We were delighted to be among the first contacts made by Arthur, W2CYK/2, a short while after he put up an antenna at his new QTH. The XYL, Madeleine, was still busy arranging the drapes but even she took time off to say "hello." We all wish them a long and happy life in their new apartment. . . . Among her many other accomplishments, Libby, KØMAS, is an amateur silversmith. Wonder how many bracelets or rings she has designed while waiting for her daughter, Betty, KØTOY, now portable 9, in Chicago, to show up for their sked? . . . One of the nicest new sidebanders we've met recently is Sam, K4JNY, who sent along a very generous supply of his most delicious pecans plucked the day before from his own pecan trees. Thanks a million, Sam, for your kindness. . . . You know how it is when you run into an old school chum whom you haven't seen for many years and how the years melt away? Well, Perry, W9FEB, and we discovered that we were alumni of N.Y.U., though several years apart, and what an enjoyable time we had discussing all our former profs. Made us feel real young again!

Spring is just around the corner . . . watch your step up on the tower and let the delivery man bring in that new final. We need you!

73, Irv and Dorothy

Control Panel [*from page 51*]

lays, or utilize relays from the junk box, in many cases age and/or misalignment will cause varying amounts of hum. With the relays secured to a panel of sorts, the panel will convert into excellent sounding board. To avoid this common pitfall, (I tried to buy a war-surplus pitfall from a distributor once, but the Government had repurchased them all for use in the missile program), it is heartily recommended that all the relays be rubber mounted. This may be done either by bolting them through a grommeted hole or securing them, via a rubber gasket, to a separate grommeted plate.

As my unit is built on a standard rack panel, I secured two right-angle brackets to the back side of the panel so that on portable forays I can screw the brackets to a temporary table, thus holding the unit fast. If the owner of the table frowns on wood screws driven into his table top, the panel can be screwed to a scrap of wood, and this in turn "C"-clamped to the table, thus keeping a modicum of peace.

For goodness sake, once the control panel is finished, identify all the control functions of the terminal board and its respective terminals. Nothing is so frustrating as to peer into the switching arrangements of a unit at a later

[*Continued on page 115*]

VHF [*from page 83*]

club members for 50 cents a year. If you run 100 watts or less, drop Harry a line. He will enjoy enrolling you.

On May 19th or 20th, K7QVK, K7BPU and K7LQI are going to operate aeronautical mobile from Seattle, Washington at various altitudes to see what DX can be worked. The flight will take place at 2200 GMT on the first of the above dates that the weather is satisfactory. They will be transmitting on 50.4 up to about 14,000 feet and would like as many contacts as possible in the two hours they will be operating. The gear will be a Heath HW-10 "Shawnee," Gonset G-50 and Elmac Transciter. The boys will have special QSL's made up for the event and will acknowledge all QSO's. Give a listen for them.

William Cronkhite, 1771 East Mountain St., Pasadena, Calif., operates on 6 and 2 and has been operating 1 kw on six meters sideband. Bill resides about 6 kc inside the lower band edge and has occasional scatter skeds with W6FZA in Porterville.

W6FZA seems to be the neucleus of considerable six meter scatter projects. W7ZQX, K7DTH and K7OFT spend a couple of hours each Saturday morning working into Porterville on c.w. scatter.

According to the *Evergreen VHF News* there are about 20 YL and XYL's operating on six in the Puget Sound area. Maybe that is why so many of the low band fellows are moving up.

WA4CQK, George, at Mt. Airy, is now on six s.s.b. and sounds good. WA4AET, Case, is also on s.s.b.

For those of you who are inclined, Otarion Electronics, Inc., P.O. Box 711, Ossining, New York, have announced what is believed to be the smallest radio control receiver. It measures a little over 1¼" square and contains 27 components. It's completely electronic and should work on six meters.

Guess that's it for now. Let's hear from *you*.

73, de Don, W6TNS

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For further information, check number 34, on page 126

Novice [*from page 68*]

The bill is S. 2361 to amend the Communications Act of 1934 to permit reciprocal licensing much the same as it operates between the United States and Canada at present. I enjoyed my opportunity to operate my mobile rig while on a trip to visit VE6GK, Herb Nicholson of Olds, Alberta and for the trip to Banff and Lake Louise. It came in handy to make inquiries while on the road. I was able to find my way to Herb's farm outside of Olds and met a number of amateurs. We were at the Calgary Stampede and the traffic was bumper to bumper for quite a while and while inching my way down-town a car following me called CQ on the horn and I waved to him and he motioned that he was mobile so we decided to pull over and have an eyeball QSO. He was from Montana and in two or three minutes we had seven hams parked and talking. We were very glad for the permit to operate while in Canada. The call-letter license plates are just one of the other privileges that many of us should be glad to have.

Bob Arbuckle, KN9DRY, 1503 Marigold Lane, Champaign, Illinois sends a long letter from which I am taking some good information and timely advice. "Hi; I am 19 years old and have had my license about 10 months. My rig is homebrew, 6AG7 and 807 combination, the hearing aid is an S-85. I would like to make a few suggestions on DX in the Novice bands. I feel, as do a lot of other hams, that a lot more listening and a lot less calling CQ DX (or CHARLIE QUEEN DOG XRAY) will bring more satisfactory results. Also that fellows put more money into receiving equipment and less into a fancy transmitter. My rig is modest, inexpensive and not fancy, my receiver is not the best either, but the antennas are half way decent, and needless to say the antenna is the most important part of the station. I was lucky enough to have room for a beam on 21 mc, a dipole on 40 meters and an inverted V on 80. I know that fellows have worked a lot of DX without a beam but I also know that a beam makes it a lot easier. I built and installed my beam in one afternoon and it has worked out very well even though I only used an old TV rotator to turn it. I have worked a few DX stations on 40 and many VEs on 80 meters. So far I have worked around 1200 fellows and have a very nice QSL file. I have WAC, WAS, WUN and RCC. I have worked about 200 DX stations and 52 countries thus far. A few are: CE1, CO6, CT1, DJ, DM, DL, EA1, F, G, GI, GM, GW, HA8, HB9, HK, JA8, K, KP4, KX6, KZ5, LA, LU, LZ1, OA4, OE, OK, ON, OZ, PA, PY, PZ, SM, SP2, TI2, UA3, VE, VO, VK2, VP8, VP9, VQ5, XE1, YU3, YV, ZB1, ZB2, ZE7, ZK1, ZP6, ZS1, 4, 6, 5R8, 6W8 and 9Q5. I sure need a card from KX6BU for that 45 minute QSO. The QSL airmailed from JA8BY made my WAC. Code speed is 25 w.p.m.

"My brother Gary is KN9HNF and he has about 40 states, too darned many YLs for him. He has been on since June.

"I wish to thank K9EGP for help in getting the ticket and W9IVB for help in DX operating information. 73 and good DXing, Bob."

Jim Villasana, WV6SNK, 421 Myrtle, Glendale, California, writes: "Here is the dope on WV6SNK. My age is 14 and I have been on the air for about 4½ months. I hope that by the time this is published I will have my new General. So far as a Novice I have worked 25 states. My code speed is 25 words per minute. I have worked some DX and had many coast to coast QSOs. The rig is a Viking II and the receiver is an HQ-100. I also have a couple of ARC-5s that I started out with on 40 and 80 meters. I like to hang around 3723 kc and have round-tables. Early in the evenings, about 5:30, a bunch of us get on and have some pretty good round-tables. My antenna is an inverted V about 45 feet high.

"My dad is WV6SNJ and my uncle is W6QLU. I will sked anyone needing California or to make them a member of the Rag Chewers Club. 73, Jim."

I will see you all at the Hamfest at Jackson Mills and help you get rid of some of that good country cooking. I guess our usual gang will be flying down there the second week-end of July. Keep the field mowed for us.

73, Walt, W8ZCV

Announcements [*from page 18*]

In arriving at the proposed schedule of fees, considerable effort has been directed towards selecting those services provided by the Commission which are readily identifiable and assigning to each a fair and equitable assessment, taking into consideration cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts.

The fees as scheduled below do not differentiate between commercial and noncommercial services. It has been suggested alternatively that noncommercial services such as noncommercial educational f.m. and TV, the public safety radio services, and the experimental services should be charged either a token fee or should be free of any fee obligation. Comments on this point are specifically requested.

The contemplated fees relate generally to the filing of applications. All filing fees would be payable at the time of filing and would be charged regardless of whether the application is granted, designated for hearing, or otherwise handled. The proposed fee schedules follow:

* * * *

Proposed Schedule of Fees For Safety and Special Radio Services

For Filing Application	*Fees*
For Amateur, RACES and Disaster Radio Services	$ 5
For Citizens Radio Service	10
For All Other Safety and Special Radio Services	20
For Special Amateur Call Sign pursuant to §12.81	5

* * * *

Authority for the adoption of the amendments herein proposed is contained in Section 4(*i*) of the Communications Act, Section 140 of Title 5 of the United States Code, and Budget Bureau Circular A-25 (September 23, 1959).

Pursuant to applicable procedures set forth in Section 1.213 of the Commission's rules, interested persons may file comments on or before April 16, 1962, and reply comments on or before May 16, 1962. All relevant and timely comments and reply comments will be considered by the Commission before final action

[*Continued on next page*]

NEW FROM HY-GAIN

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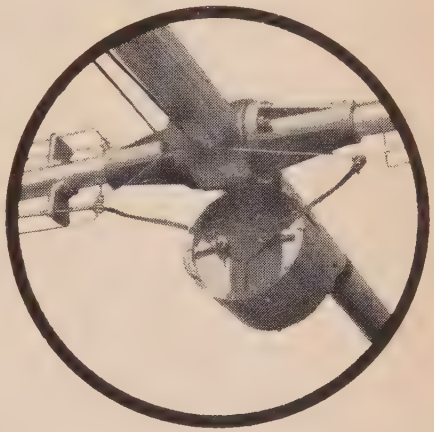

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For further information, check number 36, on page 126

ARMCHAIR PHOTOGRAPHER

In this hectic era of space stations and amphibious autos, far be it from us to criticize progress. And yet, we shake our cranium a bit sadly, and we reminisce a bit remorsefully to the days not so long ago when we hadn't yet traded our souls for do-it-yourself kits. And looking back, we remember when the pioneer of the do-it-yourself phaze was the died-in-the-wool ham who built and serviced his own station.

Even so, we must force a faint smile as we remember that even the true-blue old timer occasionally referred to *CQ* to solve a tricky problem or refresh his memory on a technical point.

Mind you, we're not opposed to progress. We just realize that there are so many new phases of our hobby being developed today that *CQ* has become a second right arm to its regular readers. And those hams who only occasionally happen to browse through a copy of *CQ*... oh, well! Some hams still like to do things the hard way.

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is taken in this proceeding. In reaching its decision on the rules of general applicability which are proposed herein, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this notice.

In accordance with the provisions of Section 1.54 of the Commission's rules and regulations, an original and 14 copies of all statements, briefs, or comments shall be furnished the commission.

FEDERAL COMMUNICATIONS COMMISSION*
BEN F. WAPLE
Acting Secretary

Attachment: Appendix A

Adopted: February 14, 1962
Released: February 16, 1962

*See attached Dissenting Statement of Commissioner Bartley.
*Commissioners Ford and Cross Dissenting.

APPENDIX A

5 U.S.C., SEC. 140

"It is the sense of the Congress that any work, service, publication, report, document, benefit, privilege, authority, use, franchise, license, permit, certificate, registration, or similar thing of value or utility performed, furnished, provided, granted, prepared, or issued by any Federal Agency (including wholly owned Government corporations as defined in the Government Corporation Control Act of 1945) to or for any person (including groups, associations, organizations, partnerships, corporations, or businesses), except those engaged in the transaction of official business of the Government, shall be self-sustaining to the full extent possible, and the head of each Federal agency is authorized by regulation (which, in the case of agencies in the executive branch, shall be as uniform as practicable and subject to such policies as the President may prescribe) to prescribe therefor such fee, charge, or price, if any, as he shall determine, in case none exists, or redetermine, in case of an existing one, to be fair and equitable taking into consideration direct and indirect cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts, and any amount so determined or redetermined shall be collected and paid into the Treasury as miscellaneous receipts: Provided, that nothing contained in this title shall repeal or modify existing statutes prohibiting the collection, fixing the amount, or directing the disposition of any fee, charge or price; Provided further that nothing contained in this title shall repeal or modify existing statutes prescribing bases for calculations of any fee, charge or price, but this proviso shall not restrict the redetermination or recalculation in accordance with the prescribed bases of the amount of any such fee, charge or price."

DISSENTING STATEMENT OF COMMISSIONER BARTLEY

While I can accept the concept that user charges, endorsed by Congress in the Independent Offices Appropriation Act of 1952, is desirable for the types of special benefits conferred by some Federal agencies, I am of the opinion that fees for services of this Commission in regulating communications by wire and radio are incompatible with certain basic principles of the Communications Act of 1934, as amended.

Regulation of communications is for the benefit of the public and not for the benefit of the industry which is regulated.

Licenses may be issued by the Commission for fixed periods only upon a finding that the public interest, convenience and necessity would be served thereby. Thus, the primary beneficiary of our licensing activities is intended to be the general public. Although a license issued by this Commission may have considerable economic value to the licensee, use under the license is always subservient to the public interest.

Licenses issued by the Commission are for use, only, of a frequency and confer no ownership rights therein. Charging fees for licenses may well create here a contention of ownership or proprietary right inherent in other types of license fee payments.

The Commission is charged with the responsibility of promoting maximum effectiveness in the use of wire and radio communication for service to the people of the United States and for the safety of their life and property. The assessment of fees would be a deterrent to effectuation of that purpose by making more difficult our implementation of new uses under Section 303(g) of the Communications Act of 1934, as amended.

In view of the foregoing, I dissent to the issuance of this proposed rulemaking.

Letters [*from page 14*]

tion. I have operated mobile on 160 since April 1958 using the Carter (W6NTU) system of screen modulation running 30 to 40 watts input. The antenna has been a standard 8-ft. center-loaded whip. During this time contacts have been made with 179 different stations, 31 of which also were operating mobile. Mobile operation in the state of California has provided QSO's with stations in Arizona, New Mexico, Nevada, Utah, Oregon, Washington, Idaho, Montana, and Wyoming. In addition, a heard report was received from South Dakota. Yes, I am quite surprised to learn that mobile operation is not very practical on 160.

Nilan L. Kincaid, W6EIG
1227 W. 140th St.
Hawthorne, California

Our apologies to OM Kincaid and many many others who took time out to voice their opinion on 160.—*Ed.*

20 Meter S.S.B.

Editor, *CQ:*

I have just read the letter of VQ4ERR in your January 1962 issue, and I am inclined to agree with him in every point.

The greatest change in radio during the last few years, has been the inclusion of 14.3-14.35 in the phone sub-band for U. S. A. amateurs, without any regard to DX stations.

It was suggested by most Latin American countries that the best change would have been to take part of those 50 kc, but also, that a small part should be kept for non W-stations. It seems now that our request was quite justified, and finally, ARRL accepted its mistake. Unfortunately, a so called "gentlemen agreement," will never work.

At the same time, ARRL can't accept publicly their mistake, so their position is towards the "gentlemen agreement" and not what it should be that of recognizing the mistake, and requesting FCC to change the rules.

Meanwhile, we all have given a twirl to their idea and I don't see any improvement on the original situation. But, DX stations, trying to work each other, are every day congregating at 14.100 to 14.140.

This action, has been forced upon us, and while there is a little room made for the DX stations, they will remain there.

Should this attitude continue, most W/K amateurs will realize that it is easier to work DX when they don't have the QRM of "Phone patch alley," "Phone switchboard," or whatever you want to call the top of the 14 mc band.

Carlos de Leon Jr., XE1CV
Apartudo Postal 31129
Mexico 19, D.F., Mexico

Self Training

Editor, *CQ:*

This hobby of ours, amateur radio, has to sell itself to the public, to the FCC, and to the representatives of the many nations at international conferences to allocate the bands of radio frequencies. One of its best selling points has been the self-training aspect. The self-trained radio operator is a decided asset to his government and its public. Somewhat as in formal training available in our school systems, one can progress in amateur just as far as his interest, his ambition, and his mental capability permits. A comparable scale relating scholastic levels to amateur radio license classes immediately suggests itself. Here's how such a scale might look:

License	*Scholastic Level*
Extra Class	College
Advanced Class	High School
General Class	Grade School
Technician Class	Kindergarten
Novice Class	Nursery School

Just as a child may progress from one educational level to another, so may the radio amateur who wishes to be a national asset.

Carl C. Drumeller, W5EHC
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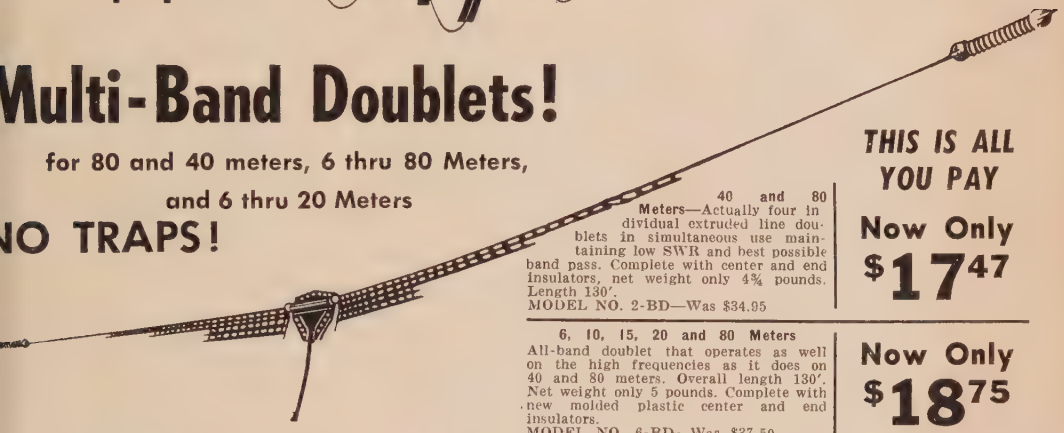

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C-4

CQ Magazine, Dept. HWS

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HTF-1	BEO-1	TRA-1	QAN-1	SPK-1	TEK-1
NHP-1	MRS-1	AMP-1	ERA-2	ABC-1	VEY-1T
SSH-1	HEC-1	MOR-1	TSC-1	HAM-2	BHJ-1
PTC-1	TEM-4	TEM-7	PRG-1	EFC-1	MMD-1
TEM-2	CAP-1	BON-1	HAP-1	IEW-1	TUB-2
VTT-1					MRC1

Please forward the following books circled above.
I enclosed $..... to cover cost and handling.

Name_____ **Call**_____
(Please Print)

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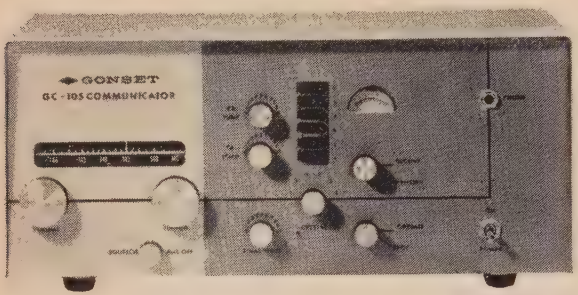
City_____ **Zone**_____ **State**_____

Get Terry's (W9DIA) Terrific Deal on Gonset...

$5.00 DOWN ...UP TO 3 YEARS TO PAY

HERE IT IS! THE NEW GONSET "GOONY BIRD"



Complete 2 Meter Station
FIXED OR MOBILE

Silicon diodes to save current drain • calibrated tunable receiver utilizes low-noise 6BZ8 RF tube in sensitive "Cascode" circuit. AVC is applied to avoid possibility of blocking by strong local signals • special gang-tuned circuits give high image rejection • dual purpose meter • increased modulation with high level clipping • all tunable circuits controlled from front pane.
Input: 6/12 DC or 115 AC volt operation, power cables supplied • Output: 6 watts nominal

$251.00 —Only $5.00 DOWN and $9.06 a month

NEW GONSET EQUIPMENT COMMUNICATOR SERIES

3341	Communicator IV. 2 meter	$390.00	$14.00
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3349	G-76 Power Supply, 115 VAC	152.75	5.5
3350	G-76 Power Supply, 12 VDC	152.75	5.5
3365	Universal Mounting kit	4.35	.1
3269-A	Crystal Calibrator	16.65	.6
G-PP-1	Hybrid Balanced Phone Patch	49.50	1.7
Super-12	Converter	94.25	3.4
3163	Police-Marine Conv. I. 63-3.0 Mc.	38.50	1.3
GR-211	Receiver, All-band	73.50	2.6
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3269-A	Crystal Calibrator	16.65	.6

NOTE: Above terms taree (3) year contract. Minimum order which can be financed for one (1) year is $60.00, for two (2) years is $120.00 and for three (3) years is $180.00
TRADES! Bigger than ever! Rush coupon!

Reconditioned Gonset Equipment — Special Price for Pre-Inventory Sale
Save Now!

Comm. I 6m.	$108	G-76 Transceiver	292
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6m. Linear III	91	G-66 Mobile Rec.	98
6-28 10m. Comm.	152	G-66B Mobile Rec.	108
G-50 6m. Comm.	188	a wa supply	29
Police Marine Conv.	15	Thin Pack	19
Tri-Band Conv.	17	G-77 Mob. Trans.	138
Super 6 Conv.	26	Superceiver	26
Super 12 Conv.	44	VFO for Converter	10
6m. Convertor	26		
6m. 12V B& Conv.	44		

LIMITED QUANTITNES.
FIRST COME FIRST SERVED.
WRITE FOR LATE LISTINGS

10% down—up to one year to pay on $60.00 order, two years on $120.00 order and three years on $180.00 order.—$5.00 deposit to hold. Subject to prior sale.

NEED CASH?

We'll buy your ham gear for spot cash. Tell us what you have to sell and we'll rush our offer.

GIANT PRE-INVENTORY SALE

Both our stores are out to reduce big inventories AT ONCE. Fantastic Savings and terrific trade on new and demonstration gear! Reconditioned equipment prices slashed! *Everything* must go before inventory! Buy NOW & SAVE!

AMATEUR ELECTRONIC SUPPLY

Two Stores to Serve You
PLEASE SEND MAIL ORDERS TO MILWAUKEE STORE

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MILWAUKEE, WISCONSIN
3832 Lisbon Avenue
Phone: WEst 3-3262

MANAGER, "DOC", W9HJS

CHICAGO, ILLINOIS
6430 Milwaukee Avenue
Phone: ROdney 3-1030

Amateur Electronic Supply—Mail Order Dept. C46
3832 W. Lisbon Ave., Milwaukee 8, Wisc.

Ship me .....
I enclose .....: I will pay the balance in

☐ 1 year ☐ 2 years ☐ 3 years

I want to buy..... and want to trade

.....What's your deal?

Name .....

Address .....

City .....State.....

☐ Send reconditioned equipment and Pre-inventory sale bulletin

For further information, check number 39, on page 126

Lawful Procedures [*from page 49*]

19. Thinking it would be quite handy indeed to operate a kilowatt s.s.b. while mobile in a Pontiac automobile, W5IYU cooks up a scheme of remote-controlling W5PAA from his car. The technical details are not too difficult, but the frequency requirements for the mobile station are closely stipulated. The lowest frequency upon which the mobile remote-controlling station may operate is:
    A. 1.8 mc C. 144 mc E. 420 mc
    B. 50 mc D. 220 mc
20. While listening on 14.2 mc, an operator at W5PAA hears a station signing: Kilowatt Six. . . . From this, the operator concludes: (mark all reasonable choices).
    A. That the station is on Wake Island.
    B. That the station is in California and is being operated by a "lid."

Answers

1. A
2. C
3. C
4. A
5. C
6. B
7. C
8. D
9. C
10. A, B, C and D
11. A
12. D
13. A
14. C
15. B
16. A
17. A
18. C
19. E
20. A and B

the HAM what am has a Waters Universal Hybrid Coupler

He has more fun . . . he has the phone patch with the most unique switch. Now for the first time: A tape recorder can be switched directly into phone patch conversations. Both sides of a QSO can be tape recorded.

With the Waters Universal Hybrid Coupler the tape recorder is now "an insider" and an integral part of your rig. The Waters Universal Hybrid Coupler not only performs as a phone patch but outpaces it by far.

This versatile network requires no power. A single 6-position switch controls all modes of operation including phone patch and tape recorder functions. No equipment changes needed for installation in any A.M. or single-sideband system.

The two-tone grey metallic case 6½" wide, 2 13/16" high, 8¾" deep, may be mounted either horizontally or vertically by reversing face plate. Theory of operation included with easy-to-follow installation and set-up instructions. Price $49.50.

WATERS MANUFACTURING, INC.
Wayland, Mass.

the HAM

HAM what am buys his Waters Universal Hybrid Coupler at:

vans Radio, Inc. P. O. Box 312, Concord, N. H.
he Lew Bonn Co. 1211 LaSalle Ave., Minneapolis 3, Minn.
adio Shack Corp. 730 Commonwealth Ave., Boston 17, Mass.
. Orange Dist. Co., Inc., 904-916 Broadway, Albany, N. Y.
eMambro Radio Supply Co., Inc., 1095 Commonwealth Ave., Boston 15, Mass.
REPCO, Inc., 314 Leo St., Dayton 4, Ohio
atry at Hartford, 100 High St., Hartford, Conn.
ustom Electronics, Inc., 1918 Brown St., Dayton 9, Ohio
ackid Radio & Television Labs, 149 Gloucester St., Ottawa, Ont., Canada
mateur Electronics, Inc., 2802 Ross Ave., Dallas, Texas
arrison Radio Corp., 225 Greenwich St., New York 7, N. Y.
ewark Electronics Corp., 223 W. Madison St., Chicago 6, Ill.
dirondack Radio Supply, 185-191 West Main St., Amsterdam, N. Y.
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ectronic Wholesalers, Inc., 2345 Sherman Ave., N.W., Washington 1, D. C.
he Hargis Co., Inc., P. O. Box 526, Waco, Texas
letronic Supply Co., 3919-21 Montgomery Rd., Norwood, Cincinnati 12, Ohio
niversal Service, 114 North Third St., Columbus 15, Ohio
eorge D. Barbey Co., 333 N. 4th St., Reading, Pa.
rchase Radio Supply, 327 East Hoover Ave., Ann Arbor, Mich.
ectronic Wholesalers, Inc., 9390 Northwest 27th Ave., Miami 47, Fla.

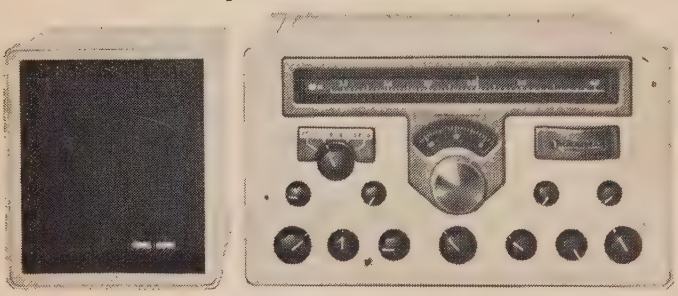
For further information, check number 40, on page 126

BARRY ELECTRONICS CORP.

ELECTRO-VOICE/RME 6900 — SSB/AM/CW HAM-BAND RECEIVER

THIS CAN BE YOURS . . .

and Barry will make it *EASY* for you to buy it.



	Amateur Net
RME 6900	$369.00
RME 6901 Speaker	$ 19.50

RME/Prepaid Anywhere USA or Foreign

BUY FOR CASH . . . OR, BARRY ELECTRONICS WILL OFFER YOU THE MOST FABULOUS TRADE-IN IN HISTORY. WRITE!

THE **RME 6900** offers optimum performance on SSB, AM or CW with no compromises or apologies to competitive high-priced receivers. Units are in factory-sealed cartons, and are covered by **Electro-Voice/RME** full-factory warranty. Whether you operate SSB, CW, or AM, you feel that the **RME 6900** was designed for you. Has complete function controls necessary for a modern communications receiver . . . Vernier control knob with overide clutch for fast tuning; RF gain; AF gain; Antenna Trimmer; Band-Selector; Stand-By/Receive/Calibrate/Transmit; ANL Limiter; "T"-Notch Filter; Internal 100 Kc Hermetically-sealed xtal calibrator. Some additional important features of the **RME 6900** are:

- **PEAK** Selectivity plus tunable "T" notch.
- NOISE Limiter for SSB and CW, AM.
- S METER Calibrated in 6 db Steps above S9 for Better Reading
- CONTROLS: 11½" Single Slide Rule Tuning Dial: Logging Scale.
- COVERAGE: 80, 40, 20, 15 and 10 on 5 Bands, plus 10 to 11 Mc for WWV or WWVH.
- 500 and 4 Ohm Outputs.
- Separate Detector for SSB
- Selectable Sideband. Upper or Lower.
- Improved Fast-Attack AVC circuit.

ONE-HAND control knob of the Modemaster Switch gives five distinct functions. The AM band width is 3.5 Kc with fast attack AVC System. In upper and lower side-band the AVC System is also switched to fast attack with the BFO automatically turned on and positioned for desired side-band reception. An advanced Product Detector switches in to replace the Diode Detector in all SSB and CW positions. When switched to the CW position, the band pass on the IF system is reduced to 500 CPS with the BFO Injection Control and Pitch, becoming operational. The AVC System is changed for optimum use when operating under CW conditions. The RME 6900 is truly the paramount CW/SSB/AM Receiver. You are cordially invited to visit us and listen for yourself.

FABULOUS trade-ins on your present receiver will be given. Let us know of your interest and we will give you the BEST POSSIBLE DEAL available! The top DX'ers now using this receiver have attested to its capabilities PARTICULARLY when QRM conditions prevail or when the rare DX shows up.

ELECTRO-VOICE MICROPHONES:

Model 664 Dynamic, HI-Z with Model 419S Desk Stand. **$57.00.**

Model 911 Crystal, HI-Z. **$19.50.**

Model 715 Ceramic, HI-Z. **$7.80.**

Model 715S Ceramic, HI-Z with Switch. **$9.00.**

Plate Transformer:
Pri: 115 VAC @ 60 CPS
Sec: 3200 V.C.T. @ 350 Ma.
Compact, shielded, Net wt: 21 lbs. 6"H x 4½"W x 6½"D. Order stock #ET-18A. **$13.95.**

Mobile Radio Power Supply: Mfd. by Minneapolis Honneywell Model W612A. Input: 12.6 VDC (Nominal) with 17 Amp Maximum current draw at full load. ALL TRANSISTORIZED. Output: Dual voltage—250 and 500 VDC, Nominal. Current—300 Ma. on 500 V. tap. 200 Ma. on 250 V. tap. 6-1/16"H x 5½"W x 3¼"D. **$54.95.**

700 Volt Dynamotor: Input: 12.6 (21 Amps.) Output: 700 VDC at 260 Ma. Brand new. **$13.95.**

Barry Electronics Corp. Dept. C-4
512 Broadway, New York 22, N.Y. WAlker 5-7000
Area Code 212

- ☐ Enclosed is money order or check and my order. Prices FOB New York City, except 6900 Rcvr & Spkr shipping free.
- ☐ Send copy of Winter "Greensheet" Supplement.
- ☐ Send information on RME 6900 Receiver.
- ☐ I have available for trade-in for the 6900 Receiver the following: .....

.....

Name .....Title

Company .....

Address .....

City .....State

For further information, check number 41, on page 126

Get Terry's (W9DIA) Deal on Hallicrafters

$5.00 DOWN ...UP TO 3 YEARS TO PAY

You'll Never Get a Better Deal on Hallicrafters than I'll Make Right Now! *Terry, W9DIA*

This picture tells the story. We're overstocked on Hallicrafters, and if you're ready to deal, I'll make you the best offer you'll ever get anywhere. Act now while we're in this spot.

Look at these low monthly payments after $5 down payment.

NEW HALLICRAFTERS EQUIPMENT — $5.00 DOWN

	Price	Monthly Payments
S-38E Recvr	$ 59.95	$ 1.98
SX-62A Recvr	359.00	14.08
S-94 Recvr	69.95	2.35
S-95 Recvr	64.95	2.35
SX-100 Recvr	325.00	11.56
SX-101A Recvr	445.00	15.89
S-107 Recvr	94.95	3.25
S-108 Recvr	139.95	4.87
SX-110 Recvr	169.95	5.96
SX-111 Recvr	279.50	9.91
*SX-115 Recvr	599.95	21.48
S-120 Recvr	69.95	2.35
SX-140 Recvr	124.95	4.33
SX-140K Recvr	104.95	3.61
SR-34AC Transcvr	395.00	14.08
R-47 Spkr	12.95	.29
R-48 Spkr	19.95	.54
HT-32B Xmtr	725.00	26.00
HT-33B Xmtr	995.00	35.75
*HT-37 Xmtr	495.00	17.69
HT-40 Xmtr	109.95	3.79
HT-40K Xmtr	89.95	3.07
HA-4 Keyer	59.95	1.98
HA-2 2-Meter Transvtr	349.50	12.44
HA-6 6-Meter Transvtr	349.50	12.44
P-26 Sup for above	99.50	3.41
FPM-200 Mob. Transcvr	1995.00	71.86
HT-41 KW Lin	395.00	14.08
S-119 SWL Recvr	49.95	1.62
S-119K Kit	39.95	1.26
CB-3 C.B. Transcvr	149.95	5.23
CB-4 C.B. Hand Held	89.95	3.06

NOTE: Above are shown for a three (3) year contract. Minimum order which can be financed for one (1) year is $60.00, for (2) years is $120.00 and for three (3) years is $180.00.

*New Prices Effective January 15, 1962.

HALLICRAFTERS RECONDITIONED GEAR — SPECIALLY PRICED FOR PRE-INVENTORY SALE. SAVE NOW!

S-120 Recr.	$ 40	S-38 Recvr	$ 18
S-107 Recr.	67	S-40 Recvr	48
S-111 Recr.	180	S-40A Recvr	53
SX-100 Recr.	180	S-40B Recvr	62
SX-62 Recr.	173	S-53A Recvr	44
SX-62A Recr.	270	S-85 Recvr	71
SX-101 Recr.	225	S-106 Recvr	35
SX-101 Mark III Revr.	250	HT-18 Trans	36
SX-101A Recr.	275	HT-30 Trans	206
S-95 Recr.	35	HT-31 Linear	135
SX-24 Recr.	53	HT-32 Trans.	372
SX-25 Recr.	53	HT-32A Trans.	423
SX-28 Recr.	81	HT-33 Linear	243
SX-28A Recr.	90	HT-40 Trans.	71

WRITE FOR OUR LATEST LISTING. 10% DOWN—up to one year to pay on $60.00 order, two years on $120.00 order and three years on $180.00 order—$5.00 deposit to hold—Subject to Prior Sale.

HOW ABOUT TRADES . . . if you have a weak heart, don't ask for our trade-in deals! It is guaranteed to amaze you. Tell us what you have! Use coupon below.

NEED CASH? We'll buy your ham gear for spot cash. Tell us what you have to sell and we'll rush our offer.

GIANT PRE-INVENTORY SALE

Both our stores are out to reduce big inventories AT ONCE. Fantastic Savings and terrific trade on new and demonstration gear! Reconditioned equipment prices slashed! *Everything* must go before inventory! Buy NOW & SAVE!

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Two Stores to Serve You

PLEASE SEND MAIL ORDERS TO MILWAUKEE STORE

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3832 Lisbon Avenue
Phone: WEst 3-3262

MANAGER, "DOC", W9HJS

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6430 Milwaukee Avenue
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Amateur Electronic Supply—Mail Order Dept. C-47
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Ship me .....
I enclose ..... : I will pay the balance in

☐ 1 year ☐ 2 years ☐ 3 years

I want to buy ..... and want to trade
..... What's your deal?

Name .....

Address .....

City ..... State.....

☐ Send reconditioned equipment and Pre-inventory sale bulletin

For further information, check number 42, on page 126

THE CQ HAM MART

MOBILE HANDBOOK

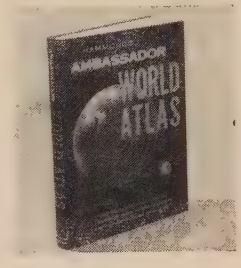
Anyone who tries to go mobile without getting this book, should register for a sanity hearing. Bill Orr, W6SAI has put everything you need to know in this book. Build-its by the dozen . . . solutions to ignition problems, keeping the battery charged, noise . . . only $2.95 postpaid.

COMMAND SETS

This is a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators. 136 fabulous, amazing terrific pages for only $1.50 postpaid.

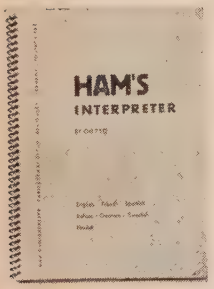
19" GLOBE

Here is a chance to preserve your breath for posterity! This beautiful World Globe, made by Hammond, is a must for every hamshack. Plain for $19.95 or lighted for $24.95. The first 10,000 people who jump at this bargin will get a year of CQ at no extra charge.



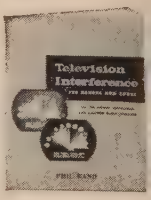
ATLAS

What! You don't know where Nicobar Island is? Incredible! And with the CQ deal on the Hammond Atlas so reasonable too. This is a reference book that will get good usage around your house if you have any kids. 7 lbs. of colored maps and a gazetteer for only $12.50 . . . and you get a year of CQ.



HAM'S INTERPRETER

Now you can talk in broken French, Spanish, Italian, German, Swedish and Finnish. This handy little book gives all the popular ham conversation in seven languages, including letters and numbers. Only $1.50 postpaid.

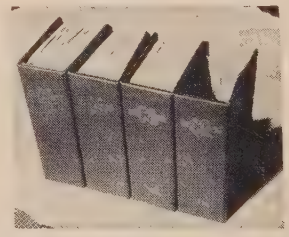


TVI HANDBOOK

W1DBM's newly written TVI book (2nd edition) covers all aspects of curing TVI from both the Ham's viewpoint and that of the TV viewer or the TV serviceman. It includes 2- and 6-meter TVI as well as Citizen's Band, Industrial, Medical and Utility TVI. Profusely illustrated with diagrams, photos, charts, tables and FCC regulations pertaining to radio and television interference. Price $1.75 postpaid, USA, $2.00 Foreign

HI-FI BOOK

This nifty volume contains the latest dope on amplifiers, pre-amplifiers, and equalizers plus a buyer's guide of component manufacturers! Over 150—5½" x 8½" pages of heavily illustrated descriptions covering Hi Fi Audio Components—the greatest publication value in its field today. Only $2.50 per copy.



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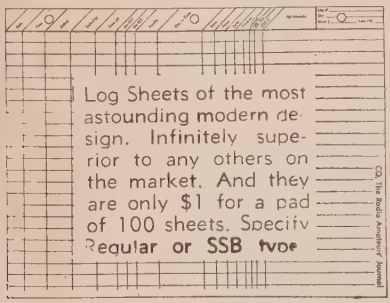
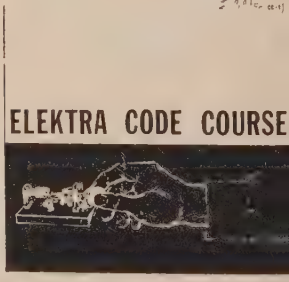
There is no other g
way to keep your back iss
Make 'em neat. We su
the binder, with the
embossed in gold, not me
a sticker which will come
later. Specify what year
want stamped on your b
er. $3.50.



CODE RECORD

Learning code is a snap with this record. Speeds from 3 to 16 WPM, depending upon turntable speed. This 12" LP record has on it all you need to learn the code for both the Novice and General License $3.50 each.

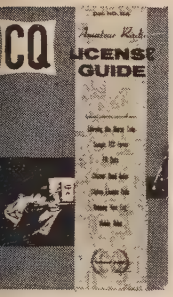


CQ ANTHOLOGY

Most amateurs do not have a good file of back issues of CQ, So we've looked back through the years 1945-52 and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out. The price is a mere $2.00.

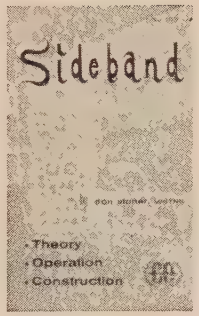
VHF FOR THE RADIO AMATEUR

You can't afford to be without this dynamic new handbook designed with the VHF amateur in mind. Filled from cover to cover with all new and original construction material presented so that you can understand it. Written by Frank C. Jones W6APF, nationally acclaimed for his VHF pioneering. Available now for only $3.50.



CQ LICENSE GUIDE

212 pages of everything the Amateur must have to get his license and progress toward the general class ticket. Plus many additional pages of vital information for the ham operator. All this for only $2.50.



SIDEBAND HANDBOOK

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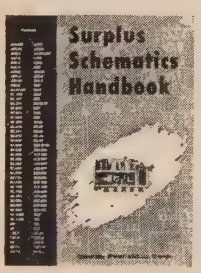

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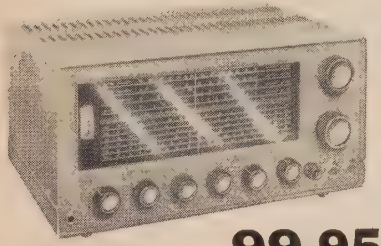

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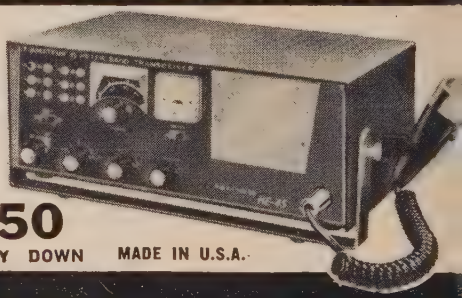

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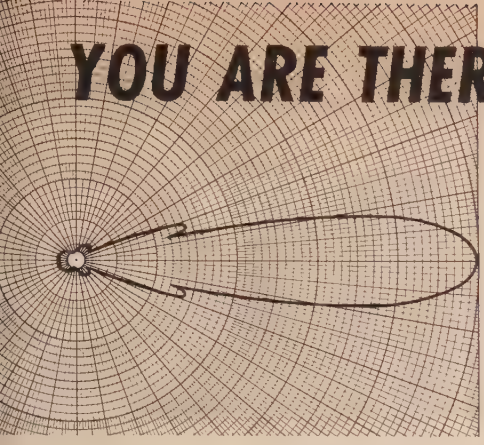

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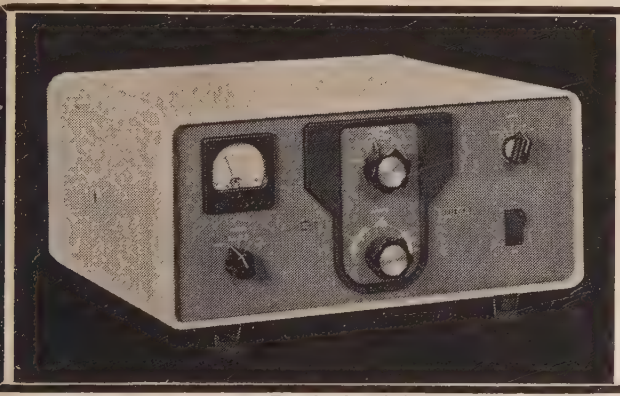

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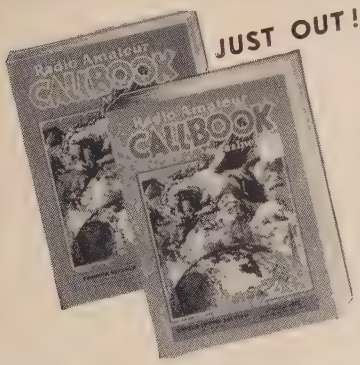

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Control Panel [*from page 100*]

date and decide that you must have been drunk when you laid it out. One simple way of preserving this information is to print or type the circuit designations on a strip of white cardboard, spaced out to fit the terminals in use, and glue it alongside the board. After the strip has set, either spray it with a clear lacquer, or quickly brush on a coat of the XYL's clear fingernail polish to protect it from the ravages of time.

We will not guarantee that the use of such a control panel as specified above will insure an immediate DXCC or a WAS on 1296 mc within 30 days, but it will go far to make the effort to do so more convenient ■

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For further information, check number 46, on page 126

Ham Clinic [*from page 87*]

Sure can, in fact this is one of the easiest questions we have ever answered. First of all, check the diaramic oscillator for odd harmonics. Next, make sure that your flambatronic synch signals are of equal amplitude. Decouple the inducto-caparis circuit until you get 2.5 kilovolts r.f. drive to your klystropenton in the first stage of the modulator. You'll find that your bias on the electromic buffer will come back to normal. If it does not you need a new flinkator tube. Good luck and hope you get it working. By the way *April Fool* to you too.

Again we remind you that there is never a fee for the service of HAM CLINIC; it is free. All the best for this month then and 75.

Chuck

RTTY [*from page 89*]

On the Bauds

W1LWV of Millinocket, Maine, is FSKing his CE 200V via a polar relay. *(Fine, Nick. That is the way to eliminate radiating transients from keyboard keying.)* W2BZN of Rochester, New York, has a GSB-100 and a Model 15, picked up in person at W3CRO. K2SKK of Livingston, New Jersey, is NCS of the East Coast RTTY Net which meets every Wednesday night on 3622 kc at 2400 GMT. WA2AZR, now in Lebanon and awaiting his OD5 call, has a Kleinschmidt TT-4A/TG machine ready to go. W3NMP of Erie, Pennsylvania, obtained Model 19 equipment through AF MARS, all of which was set up for 75 words-per-minute! *(See W3CRO for the right gears for 60 w.p.m., Cass.)* W4KZF of Erlanger, Kentucky, has a machine with weather symbols on the bottom row of keys, only. Len works 80, 40, and 20; and, has worked ZL1WB. K4UBR of Fort Walton, Florida, has worked out a method of FSKing a BC-610 on MARS frequencies. K4AGE is trying to get on RTTY from Morocco (!).

W7ZSB/5 at Killeen, Texas, is building the Twin City TU (Chapter 3, section 3.3a, the *NEW RTTY Handbook*) and is looking for a 255A polar relay. K5BVS of Waco, Texas, is using a pair of 811's in the final, a Model 15, and a W2JAV TU, K5YWW of Lawton, Oklahoma, has a model 15 and is looking for a TD. W6CQK Filters are now being built by W6NTK, Box 426, Oakhurst, California. Grant also has available the 88 mh toroids. K7AUI of Cheyenne, Wyoming, is modifying his Model 14 TD for polar relay keying. W7WWC, 3705 S. W. Stephenson Street, Portland 19, Oregon, is editor and publisher of an RTTY bulletin for the Portland area. W8VAJ of Cleveland, Ohio, is modifying his Johnson Valiant for f.s.k. to go with his Model 26, SX-100, and a CV-41/URR converter. K9CNG of Vandalia, Illinois, has a model 15 for sale. K9DXB of Merom, Indiana, is also building the Twin City TU. KØAKQ of Clinton, Iowa, is on with a Model 15 and a PAT converter.

cific. But since they are both still on the country list we took it for granted that the usual country and point credit would be taken. Nothing has been changed, KH6 is still worth 3 points and KL7 one point, when worked from the USA, and of course the usual zone and country multiplier.

VE6HG, Bill, finally got the family out of the shack so that he could hear something, only to have the rotor breakdown.

KZ5TD said that the scoring is not so good for the Central American area. Impossible not to make enemies by dropping the stateside one pointers. You're so right Tom, but just what are we going to do about it? A change in your area would make it necessary to do the same in many other areas and it could develop into quite a complicated mess.

KR6LJ, Frank. "Some leading magazine mentioned that the decreasing sun spots are making things worse DX wise. It don't look that way by my score. Of course participation seems to be greater each year in this most popular contest because of the cleancut rules and active contest committee."

Well! Need we say more? Phone results next month.

73 for now, Frank, W1WY

Working Mobiles [*from page 42*]

directions were repeated, and spelled out, I had missed the turn off.

One observation in a different vein is that it was quite rare to work a station in the same town through which I was travelling. I can't explain this except that, again, during the day most of the amateurs were working. On the high speed roads you generally left the ground wave area after two or three transmissions which finished the QSO right there. The contacts, however, which I did make in the town were very helpful and quite enjoyable.

To boil it all down, if you are fixed and wish to contact a mobile station you should: (1) Understand his situation and not view it from your own—he is moving and usually quite fast. Do not make lengthy transmissions. (2) If you reply to a mobile do not keep him "on the hook". If you do not care to QSO either do not reply or tell him on the break-in that you would like to finish your present QSO without interruption—something courteous. Then the mobile will not waste his time sitting on the frequency. (3) If you are imparting information to a mobile try not to repeat unless the mobile requests a repeat. If he cannot copy you he will let you know. (4) If you are going to handle traffic for him or even a patch, do it expeditiously or the mobile will be out of range before you can accomplish the mission. (5) If the mobile has told you he is going into a congested area and his signal sinks, wait for him to emerge or tell him before he disappears that you are signing. ■

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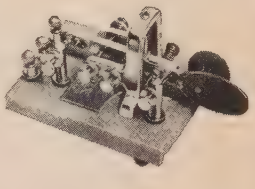

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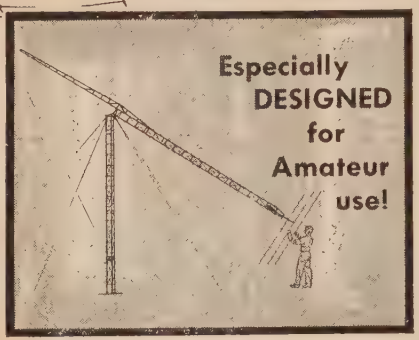

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A-1 RECONDITIONED EQUIPMENT. On approval Trades. Terms. Hallicrafters S-85 $79.00, SX-99, SX-10 $199.00. SX-111 $199.00, SX-101A $299.00. HT-32. HT-37 Hammarlund HQ-100 $129.00, HQ-129 $129.00, HQ-11 $179.00, HQ-150 $199.00, HQ-160 $229.00, HQ-170 $289.00 National NC-183D $199.00, HRO-60 $345.00; Gonset G-5 $229.00; Central 20A $149.00, Viking II $159.00, Valian $279.00, Thunderbolt linear $229.00, Collins 75S-1, 32S-1 32V-1, 32V-3, 75A-4, KWM-2; Eimac, Globe, Gonset Heath, Johnson, RME, other items. List Free. Henry Radio Company, Butler, Missouri.

TELETYPE EQUIPMENT for sale (tested); Model 1 typing reperferator, basic unit, receiving only $70 Multi Channel TD (3 sections) adapted for auto change ove from identification tape to messages, relays supplied, $100 Above units from AN/TGC-1 cabinet available where is Model 15 tables $15, table power supply $14. All equip ment with Synchronous motors. Frank Holloway, Jr., 51 N. Pinehurst Ave. Salisbury, Md. Phone 743-7432 Are Code 301.

TOROIDS: 88 mhy with mounting hardware. Uncased; like new. Information sheet included. $1 ea., 5/$4.00 Postpaid. KCM, Box 88, Milwaukee 13, Wisconsin.

"The VHF Amateur" At last a magazine for VHF'ers! Don't miss a single issue! Send $2.00 for year or $1.00 for six big issues . . . 67 Russell, Rahway, N. J.

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HAMS-EXPERIMENTERS. Free list of our interesting "surplus" surplus items sent on request. Bargains. Ariel Electronics, Box 725 Sag Harbor, New York.

RECORDING TAPE: 1007-inch reels of Scotch one mil mylar tape, 1800 feet. Used slightly, like new. $2.25 per reel postpaid. RCA 30 to 54 Mc f.m. base station, CR15A receiver, CT 10B transmitter, both have power supplies. $65 FOB. 600 volt, 300 ma transistor mobile supply. $25 PB. 300 volt, 150 ma mobile supply, $10, FOB. B&W 100B, $265 FOB. Many other items must go. Sent stamped, self-addressed envelope for list or information on above. Certified checks or money orders only. K4AHX, P.O. 3 x 608, Fern Park, Fla.

TELETYPE. Model 15, reconditioned, 110 volt 60 cycle, standard type & keyboard $110 You pay shipping. R. Torbett, 46 Prospect Street, Torrington, Conn. W1JJL.

LAFAYETTE HE-30, factory wired, used only 5 months, excellent condition. $90 or best offer. KN9IRM, Thomas Patterson, RR 1, Box 499 St. Charles, Illinois.

ITICO#460 Scope new—$75. BC-1031A Panadaptor excellent—$55. NC-46 Excellent—$60. S-36-A perfect—$80. Art Brown, c/o WCHV Charlottesville, Virginia.

SALE: BC-348-Q receiver, built-in 115VAC supply, very good condition, manual $55; AVT-112A Transmitter, AVR-20A receiver, AVA-126A power supply, new condition, manual complete $35; Remington upright communication typewriter, fair condition $12; Tapedcode Novice Course, New condition $350; BC-375E tuning units TU-5, 6, 7, 8, 20 B with CS48 cases. BC-306-A Antenna tuning unit, all new $3 each; 3 each 814, 6 each 5933/807W all new $1 each; everything FOB. Jerry Felch, W4VDC, 2416 Halmac Drive, Huntsville, Ala.

Sale New NC155 won at Lawton Hamfest Feb. 1962. Best offer over $175. W5BMQ, 321 Madison, Purcell, Oklahoma.

SELL Collins 51J-4 like new to the highest bidder, New Eair 4CX300 and sockets $45 each 4X250B and sockets $30 each; 304TL $18; 500 cps and 2/1 mech. filter for the 75A-4 $40 each, M500 silicon rectifiers 10 for $8; VRL 858S xmit. cap. 4 for $5; 50 mmfd. vacuum cap. $3.50, used 250th (less than 10 hrs.) $10. Box 120, CQ.

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SELLING: Collins 32V3, perfect, $300; TMC's GPR-90, perfect, catalogue $728 (including speaker), $325; Mechanical filter adapter with Collins 2.1 kc filter (center frequency 455 kc), $40. Combination monitone and 100 kc standard oscillator, beautifully constructed to custom standards, $22.50. Back issues of Radio-Electronics and CQ, your price. Want Ham-M Rotator. Joseph Marshall, Jr., 22 Clare Drive, East Northport, L.I., N.Y.

CANADIAN HAMS: Selling DX-100B, tested, like new, $250. E. Behr, Kenora, Ontario.

AN/FGC TERMINAL UNIT never out of crate. New complete with spares, extra set tubes, tools and manual. Price $135.00 FOB W8NLT, Mel Swillinger, 209-55th St., S.E. Charleston, West Virginia, Phone WA5-3447 or DI6-6483.

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Please send me the Booklet and Application Blank for the Camp Albert Butler Radio Session.

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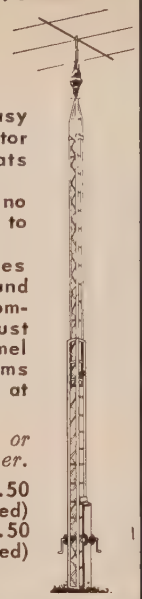

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GREENLEE TOOL CO., 1915 Columbia Ave., Rockford Illinois
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SCARCE RG-17A/U military surplus 52 ohm low los coaxial cable. Excellent condition, price in 50 foot rol $22.50, freight prepaid, limited supply. Bill Slep Company drawer 178CQ, Ellenton, Florida.

Tubes Brand New Boxed and Guaranteed 4-65A $4.5 4-125A $12.50, 4-250A $15.00, 4-400A $22.50, 4-1000 $65.00, 4X150A $6.00, 4X250B $12.50, 8CX100A5 $12.0 4PR60 $18.50, 811 $3.00, 811A $3.75, 813 $8.50, 829 $4.50, 832A $4.00, 866A $2.25, 2C39A $6.50, 3B28 $3.2 add postage-insurance, excess refunded, limited supply Bill Slep Company, Drawer 178 CQ, Ellenton, Fla.

WANTED, surplus equipment trade-in's on new factor boxed 1962 Hammarlund receivers with clocks and match ing speaker, HQ-100AC $213.95, HQ-110C $273.95, HQ 145XC $298.95, HQ-170C $388.95, HQ-180C $458.95. Ne HX-50 transmitter $399.50, HX-500 $695.00, trade in you surplus gear. We need RBL, RBK, BC-312, BC-342, BC 348, BC-610, BC-611, BC-639, BC-779, BC-1031, R-388 URR, R-390/URR, ARC-27, ARC-33, ARC-34, ARC-3 ARC-44, ARN-14, ARN-21, ARN-30, GRC-9, RT-70 Te sets with SG, URM, UPM, USM, prefixes also, othe surplus and civilian gear. Advise what surplus you ha and what you'd like. Bill Slep Company, Drawer 178 C Ellenton, Fla.

WANTED: Hallicrafters SP-44, Panadapter. State conditio and price first letter. Donald Jensen, 1832 Ridge Driv Racine Wisconsin.

TELETYPE PRINTER, TG7-B, less cover & crank. $ local or pickup only. K8DDC, Box 251, Chillicothe, Ohi

WANTED: Tubes, diodes, transistors, military, commerci lab-grade test equipment, components, PRC, GRC equi ment, Aircraft equipment by Collins. Top Prices. Wri details, Bob Sanett, W6REX, V&H Radio & Electroni 2053 Venice Blvd., Los Angeles 6, California.

FREE—RCA, GE, etc., tubes catalog. Discounts to 75 from list. Picture tubes at $75¢ inch and up. Parts,(Pa kits at 1/10 original cost. Needles, tube testers, silicon seleniums, 7" TV test tube $6.99 and more. Arctur Electronics Corp. CQ 502-22nd St., Union City, New Jerse

CUP—Core Inductances, excellent for sharp or band-pa 50 to 100 kc i.f. or b.f.o. Very high *Q*. Unused case adjustable; solder terminals. Type 1, 2.9 mh. Type 17, mh. Dollar each postpaid U.S. proper. Circuit suggestio included. Woods, 2346 Clover Lane, Northfield, Illinois.

COLLINS 75A-1, $215; KWM-1, never mobile, $450; a supply $75; d.c. supply (Brand New) $169; Mount Cable $50. (New) W8WGA

FOR SALE: ELMAC PMR-7 and AF-67 Complete wi power supplies, relay, cables. Excellent condition, best of over $280. Mel Alme, KØIMP, Drake, N. Dak.

LANSING, MICH. Mint HT-37, $340, HQ-170C $265, g.g. 813's, Neat Brew, $100. K8VNE 1620 E. Saginaw.

WANTED—Collins filter F455B3. Sell—600L, 20A, slic D-104, JT-30, kw parts, 3 inch scope, 250THs, 100 TH 810s, 3E29s, W8QJ—Detroit 3, Mich.

USED EQUIPMENT BARGAINS! List 10¢. Brand's syc more, Illinois. Equipment Wanted.

FOR SALE—Hallicrafter SX-101 Mk.3. Like new wi original speaker and manual including 2&6 meter d calibration. $215.—M. Brody, 65-43 171 St., Flushing, N.

WANTED—SP-400-X or equivalent. Cash or trade. Ei 460 scope, S-40-B receiver. State condition and pric Arthur Brown, Rt. 5 Box 366. Charlottesville, Va.

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GPR-90 $345 in perfect condition with manual. Ja Holzman K2VEH, 116 W. 14th St., N.Y.C. OR 5-7137.

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FOR SALE: 20" TV with all tubes and dud pix tube $15.00; transformer power supply, 500 volts at 250 watts $10.00; audio amplifier with tubes and power supply $8.00; 5 receiving tubes $7.00. Will split freight or postage charges. Audio amplifier and power supply are home-brew. David Allikso, 24834 Donald, Detroit 39, Mich.

SELL Gonset two element Triband beam. $40.00 FOB W6CZP, 850 Groff, Pomona.

SWAP—brand new TS-175 C/U 85-1000 mc. Frequency Meter, original carton, for HRO receiver or equal. Jerry Loecher, 16 Robert Drive, Huntington, New York, Hamilton 3-5757.

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COMMUNICATION. Teletype. Unusual surplus bargains. Free flyer. MDC 923 W. Schiller. Phila 40.

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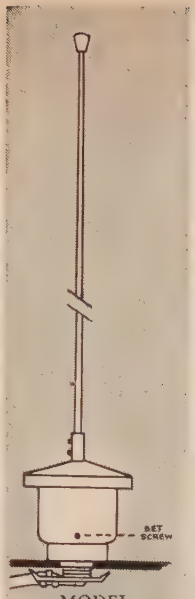

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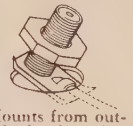

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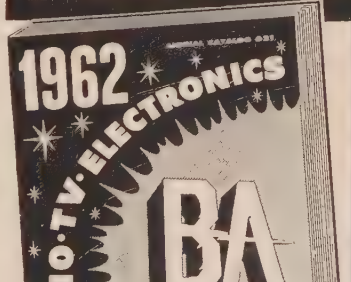

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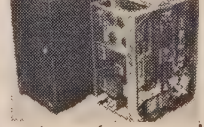

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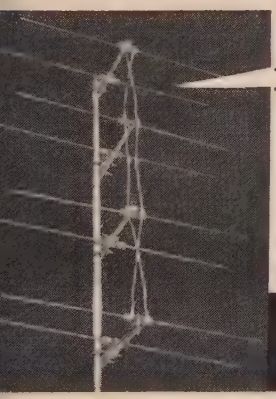

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CQ ADVERTISERS INDEX

A & B Electronics Sales 11
Aermotor Division of Nautec Corporation 1
Allied Radio Corporation 12
Alltronics-Howard Company 11
Amateur Electronic Supply 101, 105, 108, 111, 11

Barry Electronics Corporation 11
Barker & Williamson, Incorporated 1
Burstein-Applebee Company 12

C & G Electronics Company 11
Centralab 1
Cleveland Institute of Electronics 1
Collins Radio Company ..... Cover
Communications Equipment Company 12
Cush Craft 12
Cowan Publishing Corp.
CQ Bound Volume 11
CQ Change of Address 12
CQ Ham Mart 112, 11
CQ Ham Shop 12
CQ's New RTTY Handbook 1
CQ Subscription 10
CQ USA/CA Record Book 1

Dow-Key Company, Incorporated 118, 119, 12

E-Z Way Towers, Incorporated 12
EICO 1
Editors & Engineers Limited 12
Electronic Reference Library 106, 10

Fair Radio Sales 11

Gam Electronics, Incorporated 12
Goodheart, R. E., Company 11
Gonset Company 1
Gotham 1
Greenlee Tool Company 12

Hallicrafters Company 4
Hammarlund Manufacturing Company 1
Harvey Radio Company, Inc. 9
Heath Company 8
Hy-Gain Antenna Products 10

Instructograph Company 12
International Crystal Manufacturing Co. .....

Johnson, E. F. Company 24,

Lafayette Radio 11
Lampkin Laboratories, Incorporated 11

McCoy Electronics Co. .....
Millen, James Mfg. Co. Inc. .....
Mosley Electronics, Inc. .....

National Radio Company, Incorporated ....Cover II
National Radio Institute 11
New-Tronics .....

P & H Electronics .....
Pennwood Numechron Co. 11
Penta Laboratories, Inc. .....
Petersen Radio Co. Inc. .....

RCA (Electron Tube Division) .....Cover I
Radio Amateur Call Book, Inc. 12
Reeves Instrument Corporation .....
Rohn Manufacturing Company 11

Skylane Products 11

TAB 11
Telrex Laboratories 12
Texas Crystals 11

U.S. Crystals, Inc. 11

VHF Amateur, The 12
Vibroplex Co. Inc. 11

Waters Manufacturing, Inc. 10
Western Radio Co. 11
YMCA 12

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70	5.60	4.50	10.80
240	8.40	5.70	19.60
50Piv 35Rms	**150Piv 105Rms**	**D.C. Amps**	**400Piv 280Rms**
.25	.45	2	1.00
.60	1.00	3	1.80
.70	1.25	6	2.00
.85	1.50	12	2.20
1.80	2.50	35	6.10
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See QST, MARCH, 1962

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